HARRIS

TECHNICAL REQUIREMENTS SPECIFICATION

VOLUME I
FOR
MAF/TIGER ACCURACY IMPROVEMENT PROJECT (MTAIP)
PHASE 2

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REVISION H

7 APRIL 2004

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TECHNICAL REQUIREMENTS SPECIFICATION

FOR

MAF/TIGER ACCURACY IMPROVEMENT PROJECT

(MTAIP)

PHASE 2

REVISION H

7 APRIL 2004

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RECORD OF CHANGE

REVISION	DATE	DESCRIPTION
0	18 December 2002	Initial Release
A	21 January 2003	PTR #3 for Incorporation of CR0001, CR0002, and CR0004
B	24 March 2003	Incorporation of CRs 0006-0010, 0013-0021, 0023-0030, 0034-0048, 0052, and 0054
C	11 April 2003	Corrected incorporation of CRs 0010, 0013, 0017, and 0019. Also incorporated CRs 0050, 0051, 0055, 0058, and 0064.
D	23 July 2003	Incorporation of CRs 0053, 0056, 0057, 0059-0063, 0065-0067, 0071, 0072, 0086, and 0087
E	Not Applicable	Not Applicable
F	06 January 2004	Incorporation of CRs 0078, 0079, 0081, 0083, 0084, 0089, 0090, 0096, 0097, 0098, 0100, 0102, 0103, 0104, 0105, 0106, 0108, 0109, 0110, & 0111
G	03 February 2004	Incorporation of CRs 0080, 0101, & 0107
H	7 April 2004	Incorporation of CRs 0099, 0112, & 0114

FUTURE EFFECTIVITIES FOR CHANGE REQUESTS

CHANGE REQUEST	DESCRIPTION	RELEASE NUMBER	RELEASE DATE

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1.0 INTRODUCTION

Information contained in Section 1 is intended to provide background and context that the reader may find beneficial, but should not be viewed as system requirements.

1.1 Scope

This specification presents system requirements for the MAF/TIGER® Accuracy Improvement Project (MTAIP). The document contains or references all technical requirements applicable to the production and delivery of new and/or improved data for the MAF/TIGER databases.

1.2 MTAIP Project Overview

The Geography Division, United States Census Bureau (Census Bureau), has a requirement to improve the accuracy of the information in its Master Address File (MAF) and associated Topologically Integrated Geographic Encoding and Referencing (TIGER®) database. The MTAIP is the primary vehicle by which MAF/TIGER accuracy improvement will be achieved.

1.2.1 Project Background

The MAF is intended to be a complete and current list of all addresses and locations where people live or could live, as well as the addresses or locations where people work or could work. Also, the MAF is intended to contain information that identifies methods for the Census Bureau to communicate with the residents or employees at these addresses and locations.

TIGER is the system and digital database developed at the Census Bureau to support the decennial census and other Census Bureau statistical programs. The topological structure of the TIGER database defines the type, location, name, and relationship of streets, rivers, railroads, and other geographic features to each other and to the numerous geographic entities for which the Census Bureau tabulates data from its censuses and household surveys.

The Census Bureau's operational requirements have expanded since the inception of the MAF and the TIGER databases. The technology available to support field activities and update of the information in the system has improved dramatically. Preparations for Census 2000 highlighted the need for this aging national resource to be improved and updated. Accuracy improvement is geographically necessary to support the Census Bureau's post-Census 2000 statistical programs, including 2010 Census testing activities, nationwide implementation of the American Community Survey, and the 2010 Census.

1.2.2 Project Goals

The primary goal of the MTAIP is the delivery of improved, accurate, and current information to the MAF/TIGER database. This improvement will provide corrected coordinates for every existing TIGER feature and will identify new features not now in TIGER with accurate coordinates and required attributes. This improvement also will include identification of coordinates, as well as an address and location, for each required structure in the United States, Puerto Rico, and the associated Island Areas. The capability will be developed to link each address and coordinate with a corresponding record in the MAF.

A further goal is development of a plan for a maintenance mechanism to regularly update the inventory of features in the TIGER database and the inventory of structures and their addresses in the MAF.

Improving the accuracy of feature coordinates will provide base information suitable for use with Global Positioning System (GPS)-equipped mobile computing devices (MCDs) and facilitate the gathering of accurate location information for all living quarters and workplaces.

The Census Bureau plans to have accurate and up-to-date information in MAF/TIGER for all 3,233 counties and statistically equivalent entities, and to do so by the end of FY 2008. In addition to improving the locational accuracy of existing features and required addresses (structures), there is a need to identify and add new features and structures to the database, as well as to remove nonexistent features and structures.

1.2.3 Project Benefits

Improved MAF/TIGER accuracy facilitates the efforts of the Census Bureau's enumerators to find the correct living quarters for questionnaire delivery, nonresponse follow-up operations, and evaluation operations. Also, improved accuracy will facilitate the Census Bureau's efforts to tabulate data in the correct census block as well as the other geographic entities that it uses in data presentations. And very importantly, a more accurate TIGER database will facilitate digital data exchange with federal, state, local, and tribal partners, avoiding duplication of effort and expense by those organizations.

1.3 Project Tasks

1.3.1 Task 1 - Improve the Accuracy of Coordinates in the TIGER Database

Task 1 is to enhance the accuracy of the coordinates for all streets and other map features in the TIGER database for all counties and statistically equivalent entities in the United States, Puerto Rico, and the associated Island Areas.

The specific content of the TIGER database that requires accurate alignment includes: streets, roads, hydrography, railroads, residential structures, workplace structures, landmarks, pipelines, and power lines.

Accurate alignment also includes preservation of current shape and relative location of selected nonvisible features, such as governmental unit boundaries.

As a goal, the horizontal accuracy required for realignment of TIGER coordinates (including required structures) is to be such that the geographic positional coordinates will correctly place an enumerator, relying on a GPS-equipped MCD:

- At the desired structure 100 percent of the time

- On the correct side of the street (i.e., in the correct census block) 100 percent of the time

- In the correct relationship to legal boundaries, other boundaries, and neighboring structures 100 percent of the time.

An objective of this task is that the resulting corrected files have all features and required structures that exist within one year prior to the time of delivery.

1.3.2 Task 2 - Associate Each MAF Address With the Accurate TIGER Database

Task 2 is to associate a city-style mailing address – an address that uses a house number and street name – with the coordinates of each required structure. When a required structure does not have a city-style mailing address, the goal is to provide coordinates for the structures and, where available, the actual mailing address (Rural Route and box number or equivalent) and/or an E-911 address.

1.3.3 Task 3 - Enhance Relationships With Federal, State, Local, and Tribal Partners

Task 3 is the use of GIS data from the Census Bureau's partners (once the Census Bureau determines that the materials meet MTAIP requirements), and to do so before considering any other options for realignment.

A further goal of Task 3 is the development of a process that utilizes ongoing Census Bureau receipt of acceptable information from federal, state, local, and tribal government geographic partners in the maintenance of the information in the MAF/TIGER databases.

1.3.4 Task 4 - Maintain MAF/TIGER by Detecting Change

The initial improvement of MAF/TIGER location accuracy and related data must be completed prior to the end of FY 2008 in preparation for the Census Bureau's 2010 Census.

Task 4 is to update the inventory of streets, other geographic features and structures through the 2010 Census (FY 2010). A further goal of this task is to have the information in the MAF/TIGER databases maintained to a currency of 1 year or less at all times. When the TIGER information is updated with additions and deletions, the MAF information must be updated concurrently.

The geographic partnerships with federal, state, local, and tribal governments must be maintained as part of the update system put into place. Beginning in FY 2004, updates must be made to MAF/TIGER to record the additions and deletions of structures, roads, streets, railroads, hydro and other features. This maintenance must remain ongoing through the 2010 Census and ensure that new features and structures are updated within the prescribed time period.

1.4 Font and Type Conventions

The following font and type conventions are employed throughout this document:

Specific record types are presented in **Bold** type (e.g., **Record Type G**, or **RT-G**).

Specific TIGER sub files are referred to by their record type, and are also presented in **Bold** type (e.g., **Record Type P File,** or **RT-P File**).

Specific fields within a record are presented in ***Bold Italics*** type font (e.g., ***Feature Name***).

With the exception of their use above for illustrative purposes (and their use in section headings), Bold and Bold Italics type font are used exclusively to indicate Record Types, Record Type Files, and data fields.

Non-bolded italics are used throughout to provide emphasis and to differentiate words and phrases, usually the first time they appear.

2.0 APPLICABLE DOCUMENTS

The documents listed in this section serve as source or reference material for this specification. Notwithstanding, this Technical Requirements Specification contains all technical requirements applicable to the MTAIP.

2.1 Government and International Specifications, Standards, and Documents

MAF/TIGER Accuracy Improvement Project RFP (09 Jan 2002)

MAF/TIGER Accuracy Improvement Project Statement of Objectives (09 Jan 2002)

TIGER Documentation - Version 9.0

Census 2000 TIGER/Line Files Technical Documentation (Oct 2001)

MAF Census 2000 Address List Basics (Mar 1999)

MAF Update File Layout (07 May 2002)

MAF Update File Field Descriptions (07 May 2002)

MAF Extract File Field Descriptions (09 Jul 2002)

Edge Verification Edit (EVE) for TIGER Partition Edges (R. Fusaro memorandum, 09 Mar 1999)

Quality Assurance Plan, TIGER/Line 2000 Files Improvement

Census 2000 Geographic Terms and Concepts (Dec 2001)

The Positional Accuracy of MAF/TIGER (07 Feb 2001)

U.S. Census Bureau Handbook for Information Technology Security (Jan 2001)

U.S. Census Bureau Strategic Technology Plan

FIPSPub 5-2 Codes for the Identification of the States, the District of Columbia and the Outlying Areas of the United States, and Associated Areas (28 May 1987)

FIPSPub 6-4 Counties and Equivalent Entities of the U.S., Its Possessions, and Associated Areas (31 Aug 1990)

FIPSPub 9-1 Congressional Districts of the U.S. (30 May 1990)

FIPSPub 55-3 Codes for Named Populated places, Primary County Divisions, and other Locational Entities of the United States, Puerto Rico, and the Outlying Areas (28 Dec 1994)

FIPSPub 173-1 Spatial Data Transfer Standard (10 Jun 1994)

The National Map, USGS (30 Nov 2001)

National Hydrography Dataset, Contents and Concepts (Feb. 2000)

United States National Map Accuracy Standards, USGS

National Mapping Program Technical Instructions, Part 3 - Feature Specifications and Compilation

ISO/IEC 8859-1 Information technology -- 8-bit single-byte coded graphic character sets -- Part 1: Latin alphabet No. 1

ANSI/ASQC 9001 Quality Management and Quality Assurance Standards

ISO Technical Committee Draft 15046-13: Geographic information - Part 13: Quality principles

ISO Technical Committee Draft 15046-14: Geographic information - Part 14: Quality evaluation procedures

2.2 MTAIP Phase I Documentation

GEO MTAIP Position Papers - Boundaries (14 Aug 2002)

GEO MTAIP Position Papers - Driveways (19 Aug 2002)

GEO MTAIP Position Papers - Features (14 Aug 2002)

GEO MTAIP Position Papers - Hydrography (14 Aug 2002)

GEO MTAIP Position Papers - Metadata (14 Aug 2002)

GEO MTAIP Position Papers - Roads (14 Aug 2002)

GEO MTAIP Position Papers - Structures (05 Aug 2002)

GEO/Harris MTAIP Information Exchange Minutes (05 Aug 2002)

GEO/Harris MTAIP Tech Exchange Minutes - Specifications (30 Jul 2002)

GEO/Harris MTAIP Tech Exchange Minutes - Features (26 Jul 2002)

GEO/Harris MTAIP Tech Exchange Minutes - Data Sources (30 Jul 2002)

GEO/Harris MTAIP Tech Exchange Minutes - Boundaries (30 Jul 2002)

GEO/Harris MTAIP Tech Exchange Minutes - Addressing and Structures (29 Jul 2002)

GEO/Harris MTAIP Tech Exchange Minutes - Field Data Collection (09 Aug 2002)

GEO/Harris MTAIP Tech Exchange Minutes - Delivery Format (31 Jul 2002)

GEO/Harris MTAIP Tech Exchange Minutes - Change Detection (09 Aug 2002)

TBMWG Report from Data Format Subgroup - Census Bureau to Harris Data Exchange (Southbound)

TBMWG Report from Data Format Subgroup - Harris to Census Bureau Data Exchange (Northbound)

TBMWG Report from Address Harvesting Subgroup - Requirements for Address Harvesting

TBMWG Report from Address Harvesting Subgroup - Address Harvesting Data Element Definition

TBMWG Report from Edge Matching Subgroup - Requirements & Format for Edge Matching

TBMWG Report from Edge Matching Subgroup - Edge Matching Scenarios

TBMWG Report from Feature Subgroup - Feature and Characteristics Matrix

TBMWG Report from Feature Subgroup - Feature Characteristic Domains

DSAWG Report from Road, Hydro, and Other Subgroup - Minimum Source Standards

DSAWG Report from Data Precedence Subgroup - Source Precedence Matrix

DSAWG Report from TED Extraction Subgroup - TED Date Extraction Report

CBAWG Report from Threads Subgroup - Initial Production Processing Thread Document

CBAWG Report - "Big 4" Source Qualification (07 Nov 2002)

CBAWG Report from Change Detection Interval Subgroup - Maintenance/Change Detection Criteria (07 Nov 2002)

PPQAWG Report from QA Approach Subgroup - MTAIP Quality Assurance Process

PMWG Action Items from Pre-Planning Checkpoint Meeting (11 Sep 2002)

Quality Assurance Requirements for MTAIP (J. Waite memorandum, 16 Dec 2002)

MTAIP Boundary Processing Guidelines (in development)

The National Hydrography Dataset (J. Knott monograph, 20 Aug 2002)

Harris TIGER CAT Checkers for MTAIP (26 Aug 2002)

Harris Acceptance Test Plan for MTAIP (18 Dec 2002)

Harris Configuration Management Plan for MTAIP (18 Dec 2002)

Harris Cost Benefit Analysis Report for MTAIP (18 Dec 2002)

Harris Data Source Analysis Report for MTAIP (18 Dec 2002)

Harris Government Furnished Information Schedule for MTAIP (18 Dec 2002)

Harris Performance Work Statement for MTAIP (18 Dec 2002)

Harris Production Plan for MTAIP (18 Dec 2002)

Harris Production Processing Thread Document for MTAIP (18 Dec 2002)

Harris Production Qualification Test Plan for MTAIP (18 Dec 2002)

Harris Project Management Plan for MTAIP (18 Dec002)

Harris Quality Assurance Plan for MTAIP (18 Dec 2002)

Harris Source Data Evaluation and Acquisition Plan for MTAIP (18 Dec 2002)

Harris System Engineering Management Plan for MTAIP (18 Dec 2002)

2.3 Non-Government Publications

Harris MTAIP Proposal, Vol. 2 - Technical Solution & Organizational Resources (25 Feb 2002)

Harris MTAIP Proposal, Vol. 3 - Cost Proposal (03 Jun 2002)

Harris MTAIP Proposal, Vol. 3 - Updated Cost Proposal (25 Jun 2002)

Harris GCSD Systems Engineering Manual, S-401-001 (current version)

Harris GCSD Quality Assurance Functional Manual, S-700-001 (current version)

MAF/TIGER Modernization Study (BAH - 07 Jun 2000)

ITS088 Harris Requirements Specifications Document, v Harris 2.3 (14 Feb 2002)

Intermap Specification

MAF/TIGER Enhancements Program - TIGER Realignment (Task 4) - Technical Requirements and Specifications (AKA the GeoServ specification), v 3.0, (08 Nov 2002)

Capability Maturity Model Integration for Systems Engineering/Software Engineering, v 1.02 (Nov 2000)

2.4 Order of Precedence

ReqID-89   In the event of a conflict between this document and any of the references cited above or referred to herein, the text of this document SHALL have precedence.

3.0 SYSTEM FUNCTIONAL REQUIREMENTS

3.1 Improve the Accuracy of Coordinates in the TIGER Database

Requirements within section 3.1 relate to MTAIP Task 1 - Improve the accuracy of coordinates in the TIGER database.

As stated in the Census Bureau's Statement of Objectives, the goal of Task 1 - TIGER accuracy improvement is to provide geographic positional coordinates that will correctly place an enumerator, relying on a mobile GPS-equipped computer, at the desired structure, on the correct side of the street, in correct relationship to boundaries and neighboring structures.

This goal has been restated as two primary mission requirements:

- Properly spatially locate every structure such that they will be tabulated into the correct Census block.

- Get an enumerator (relying on a mobile GPS-equipped computer) to the correct location.
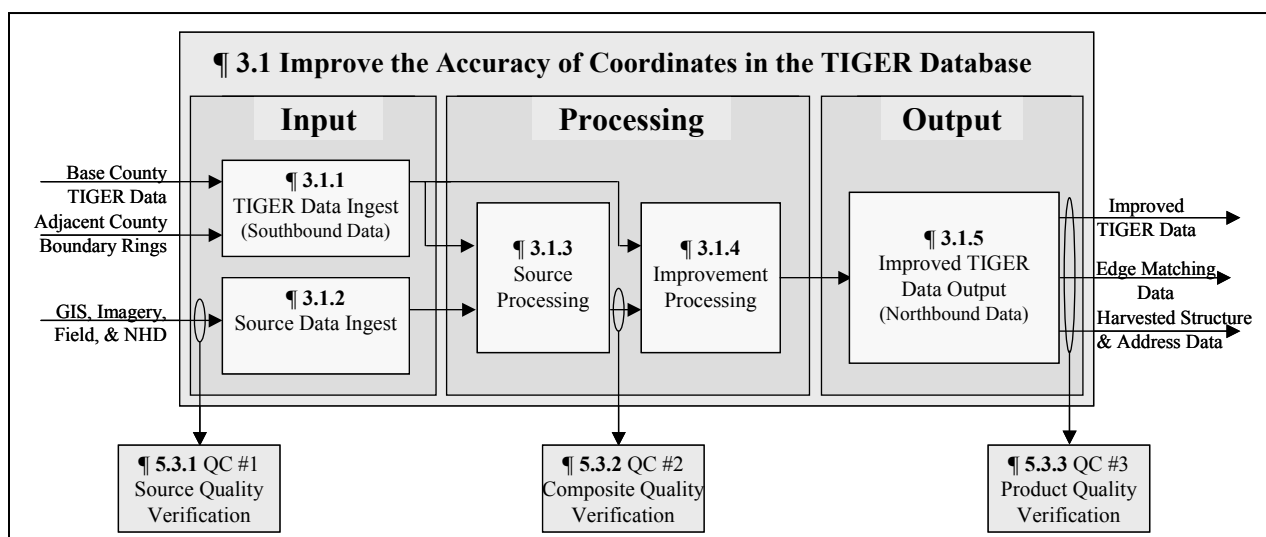
Figure 3.1 Accuracy Improvement Functional Block Diagram

The MTAIP functional requirements defined herein establish a capability to achieve TIGER accuracy improvement. These requirements are divided into five major functional areas: TIGER data ingest, Source data ingest, Source processing, Improvement processing, and Improved TIGER data output, as illustrated in Figure 3.1.

The performance requirements derived from the goals above are defined in Section 4.

3.1.1 TIGER Data Ingest - Southbound Data

The TIGER database is a single geographic data set that covers the United States, Puerto Rico, and the associated Island Areas. TIGER exists as a topological structure that defines the location and relationship of streets, rivers, railroads, and other features to each other and to numerous geographic entities. TIGER is regularly updated as a result of information gained by numerous programs conducted by the Census Bureau.

For the purposes of MAF/TIGER accuracy improvement, the Census Bureau will partition a current "snapshot" of TIGER data covering the county tasked for production. The county partition provided in the

Southbound data will not contain every data field for a county held within the TIGER database, but will consist of all data required for MTAIP processing, feature update/attribution, and accuracy improvement.

ReqID-2688   TIGER data ingest SHALL have the capability to ingest incoming TIGER data, as specified in 3.1.1.1 through 3.1.1.14.

3.1.1.1 General

MTAIP TIGER files provided by the Census Bureau are extracts of selected information from the Census Bureau's TIGER database. Features and attributes in the files include roads and streets, hydrographic features, railroads, feature names, feature classification codes, address ranges, ZIP Codes, codes for legal and statistical entities, latitude/longitude coordinates of linear and point features, landmark features, area landmarks, key geographic locations, and area and polygon boundaries.

3.1.1.1.1 Southbound TIGER File Organization

Southbound TIGER files are organized by record type; where all records of a given type are exclusively contained within a single sub file, which is referred to by the record type contained therein. Southbound TIGER data consists of 13 record types; hence there are 13 sub files that collectively make up the TIGER data files for the county (or county equivalent). It is possible that there may not be data for some of the sub files. In this case, an empty sub file will be sent.

The MTAIP TIGER dataset is substantially different from the TIGER/Line™ dataset, both in terms of content, format, and function. Similarly, MTAIP TIGER Record Types are substantially different from TIGER/Line™ Record Types (although some names are the same).

Southbound files employ a naming convention beginning with the trigraph *AIP* (Accuracy Improvement Project), rather than the standard TIGER/Line™ nomenclature.

ReqID-2932   TIGER data ingest SHALL accept MTAIP TIGER data partitioned by county (or county equivalent).

ReqID-2718   TIGER data ingest SHALL accept MTAIP TIGER data consisting of 13 interrelated sub files each containing a single record type, as identified in Table 3.1.1.1-1.

ReqID-2934   Each sub file SHALL consist of a single record type.

ReqID-12853   Each sub file SHALL contain zero or more records.

ReqID-14285   Each of the 13 sub files SHALL be present.

ReqID-14286   Sub files with no data values SHALL be empty files.

ReqID-2717   TIGER data ingest SHALL accept the TIGER data in a flat file format.

ReqID-12626   TIGER data ingest SHALL accept the TIGER data with an ISO 8859-1 character set, commonly referred to as Latin-1.

ReqID-2936   TIGER data ingest SHALL accept a topologically consistent network across the county.

3.1.1.1.2 TIGER Data for Adjacent Counties

The Census Bureau will provide TIGER data for every county adjacent to a subject county (the production county; for which TIGER data was provided per 3.1.1.1.1). These boundary rings are provided for the purpose of edge matching county boundaries. Boundary rings consist of the entire outer ring of polygons for the adjacent county (even though edge matching only requires the portion of an adjacent county's boundary ring that abuts the subject county).

Figure 3.1.1.1 illustrates an example subject county (Childress County, TX) and its adjacent counties (Collingsworth, Harmon, Hardeman, Cottle, and Hall). In this example, TIGER data is provided for the entire extent of the subject county, as shown in lightly shaded orange. TIGER data for the adjacent counties is provided as a ring around each adjacent county (The coverage of the TIGER data for the adjacent county boundary rings is illustrated by the five blue rings around the counties adjacent to Childress.)
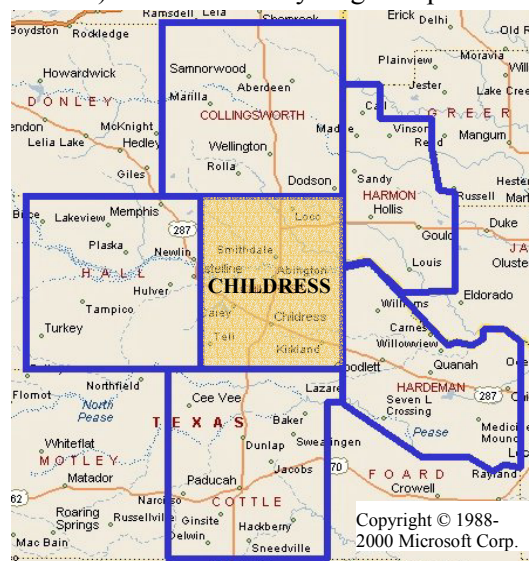
Figure 3.1.1.1 Example MTAIP Boundary Rings

ReqID-595   TIGER data ingest SHALL accept TIGER data for adjacent counties, for use in edge matching.

ReqID-2706   Data for an adjacent county SHALL be accepted in the form of a boundary ring consisting of the outermost layer of 2-cells (polygons) in the adjacent county.

ReqID-795   Data for adjacent counties SHALL be accepted in a separate Southbound data set for each county.

ReqID-597   TIGER data ingest SHALL accept adjacent county TIGER files in a format identical to those for the subject county (consisting of all 13 MTAIP sub files, even if some sub files are empty).

3.1.1.1.3 File Naming Convention

The sub files for each county (or county equivalent) are identified by state and county FIPS code. Each sub file name includes a file suffix that indicates the record type of that sub file.

TIGER data ingest accepts MTAIP TIGER files that use the following common naming convention:

ReqID-2940   The first three characters SHALL be the letters "AIP", indicating that the file contains Accuracy Improvement Project data.

ReqID-2941   The fourth and fifth characters within the TIGER filename SHALL be the numeric two-digit state FIPS code.

ReqID-14301   The sixth, seventh, and eighth characters within the TIGER filename SHALL be the numeric three-digit county FIPS code.

ReqID-2943   The file extension SHALL identify the Record type using the extension ".RT*X*", where "*X*" is the record type of the file.

Two example file names are shown below:

10

AIP12009.RT1 = MTAIP data for Brevard County (009), Florida (12), with a file of **Record Type 1**

AIP24033.RTN = MTAIP data for Prince George's County (033), Maryland (24), with a file of **Record Type N**.

ReqID-14287   File names and file extensions SHALL be expressed in UPPER CASE ONLY.

ReqID-14288   File names and file extensions SHALL no contain any blank_characters.

Table 3.1.1.1-1 Southbound TIGER Data Record Types

Record Type	Name	Function
RT-0	Zero Cell Record	Defines coordinates and attributes for nodes
RT-1	One Cell Record	Defines attributes for lines and feature segments
RT-S	Shape Coordinates Record	Defines shape points for line segments
RT-P	Polygon Boundary Record	Defines polygon boundaries for geographic entities and area landmarks
RT-G	Geographic Entities Record	Defines geographic entities and their names
RT-K	Area Landmark Feature Record	Defines attributes for Area Landmark Features
RT-L	Point Feature Record	Defines coordinates and attributes for Point Landmark Features
RT-C	Characteristics Record	Defines characteristics for linear, areal, and point features
RT-R	Name and Address Relationship Record	Links features to name and address records
RT-N	Name Record	Defines names for linear, areal, and point features, plus geographic entities
RT-A	Address Number Data Record	Defines addresses and address ranges for linear and point features
RT-I	Non-Census IDs Record	Defines Non-Census IDs for features
RT-M	Metadata Record	Defines actions, conditions, means, and quality values for features, names, and attributes

3.1.1.1.4 Record Keys

Each record in each sub file is identified by an ID code that serves as a record key in a database sense. A record key consists of a record type, record ID code, and a date field. The record key may be applicable only to the data exchange, or may contain a permanent TIGER ID code, such as the TLID. When one TIGER sub file makes reference to another, that reference is via the **Record key**.

ReqID-852   TIGER data ingest SHALL accept a 17 character **Record key**.

ReqID-2723   The Record key SHALL be a record's foreign key, used by other records when referring to a record.

ReqID-2721   The content and format of the **Record key** SHALL be as defined in Table 3.1.1.1-2.

Table 3.1.1.1-2 Composition of Southbound Record Key

Field length is 17 (seventeen) characters		
Character 1	Record type	Alphanumeric character indicating the record type (e.g., "N" for Record Type N, or "1" for Record Type 1)
Characters 2-11	Record ID code	Alphanumeric characters are unique within a record type. Two record types use permanent numbers in TIGER (e.g., the RT-1 Record ID code is the permanent 1-cell TLID; the RT-0 Record ID code is the permanent 0-cell TZID).
Characters 12-17	Date	Date the file was created; format is YYMMDD

3.1.1.1.5 Southbound Geographic Coordinate System

ReqID-8174   TIGER data ingest SHALL accept geographic features based on North American Datum 1983 (NAD83).

ReqID-8175   TIGER data ingest SHALL accept TIGER data with geographic coordinates (latitude and longitude).

ReqID-12846   Geographic coordinate units of measure SHALL be decimal degrees.

ReqID-8176   Latitude and longitude coordinates SHALL be carried to 7 (seven) decimal places (to the right of the decimal point).

ReqID-8177   TIGER data ingest SHALL reference as the prime meridian the line of longitude that passes through Greenwich, England.

ReqID-2959   Latitude fields SHALL be formatted as defined in Table 3.1.1.1-3.

Table 3.1.1.1-3 Southbound TIGER Latitude Field Layout

Field length is 10 (ten) characters		
Character 1	Value = "+" or "–"	"+" indicates the Northern Hemisphere "-" indicates the Southern Hemisphere
Characters 2-3	Degrees of latitude	Leading zero is required for degrees less than 10
The decimal point is implied		
Characters 4-10	Decimal degrees	Trailing zero(s) are required.

ReqID-8178   Longitude fields SHALL be formatted as defined in Table 3.1.1.1-4.

Table 3.1.1.1-4 Southbound TIGER Longitude Field Layout

Field length is 11 (eleven) characters		
Character 1	Value = "+" or "–"	"+" indicates the Eastern Hemisphere "-" indicates the Western Hemisphere
Characters 2-4	Degrees of longitude	Leading zero(s) is/are required for degrees less than 100.
The decimal point is implied		
Characters 5-11	Decimal degrees	Trailing zero(s) are required.

3.1.1.1.6 Record Layout Table Convention

A record layout table provides the contents and layout of data elements within a data record. The terminology of the table headings is described below.

> Field Name; identifies the name of the data element, as used within this document

> Field Identifier; identifies the field identifier or abbreviated name of the data element

> BV - Blank Value; identifies if a data element is optional

- Value of *Yes* means the data element can be blank

- Value of *No* means the data element is required

Fmt - Format; identifies format justification of the field

- Value of *L* means the field is left justified

- Value of *R* means the field is right justified

Type - Data Type; identifies data type of the field

- Value of *A* means the data is alphanumeric

- Value of *N* means the data is numeric

Beg - Beginning character; identifies specific record location of the first character (or space) of the data element

End - Ending character; identifies specific record location of the final character (or space) of the data element

Len - Length; identifies the number of characters in the data element field

3.1.1.2 Record Type 0 - Zero-Cell Record

Record Type 0 (**RT-0**) (numeric zero) provides geocoordinates for 0-cells (nodes). A *node* is a zero-dimensional object that is a topological junction of two or more links or chains, or an end point of a link or chain.

RT-0 is a primary record type in the TIGER files.

Figure 3.1.1.2 illustrates TIGER zero-cells, or nodes. The zero-cells are defined by their longitude and latitude.

Note: Each zero-cell in the figure is defined in a separate **RT-0** record within a single **RT-0 File**.

Defining Zero Cells		
Node A	Long (A)	Lat (A)
Node B	Long (B)	Lat (B)
Node C	Long (C)	Lat (C)
Node D	Long (D)	Lat (D)
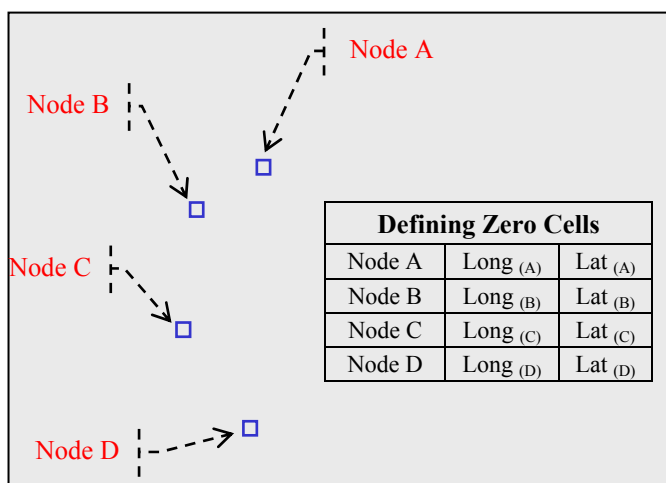
Figure 3.1.1.2 Zero-cells in Southbound Files

3.1.1.2.1 Purpose

ReqID-2963 TIGER data ingest SHALL accept an **RT-0** record, identifying the geocoordinates of 0-cells (nodes).

ReqID-2964 TIGER data ingest SHALL accept one **RT-0** record for each 0-cell in the county TIGER data.

ReqID-12205 TIGER data ingest SHALL accept the relationship between **RT-1** and **RT-0**, as defined below:

A **RT-0** record identifies the coordinates of the Start Node of the **RT-1** chain, when referenced by an **RT-1** *Key FROM zero-cell ID* field.

A **RT-0** record identifies the coordinates of the End Node of the **RT-1** chain, when referenced by an **RT-1** *Key TO zero-cell ID* field.

3.1.1.2.2 Record Format

ReqID-7464   TIGER data ingest SHALL accept the **RT-0 File** consisting of multiple records, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-2968   TIGER data ingest SHALL accept the **RT-0** record layout defined in Table 3.1.1.2.

3.1.1.2.3 Data Element Dictionary

ReqID-11917   TIGER data ingest SHALL accept **RT-0** data elements, as identified in this section.

ReqID-2908   TIGER data ingest SHALL accept the *Record key* as the **RT-0** foreign key, defined as follows:

> 1 (one) character *Record type* (the value is always numeric "0" in this record type)

> 10 (ten) character *Record ID* code

> 6 (six) character Date (date the file was created, YYMMDD format)

Table 3.1.1.2 Record Layout for Record Type 0

Description	Field	BV	Fmt	Type	Beg	End	Len
Record key	zeroCellRecID	No	L	A	1	17	17
Longitude	LONG	No	R	N	18	28	11
Latitude	LAT	No	R	N	29	38	10
Special type	SPEC_TYPE	Yes	R	A	39	39	1
Key to metadata record	MID	Yes	R	A	40	56	17

ReqID-2727   The ten-character *Record ID* code within the *Record key* SHALL represent the permanent TIGER 0-cell ID code (TZID).

ReqID-2849   TIGER data ingest SHALL accept the *Longitude* and *Latitude* fields identifying the geocoordinates of the 0-cell, formatted per 3.1.1.1.5.

ReqID-12857   TIGER data ingest SHALL accept the *Special type* field that identifies 0-cells with special characteristics associated with road features.

ReqID-12858   Acceptable values of *Special type* SHALL be as defined below:

> C = Cul-de-sac

> F = Fixed barrier to travel

> G = Gated barrier to travel

> T = Toll booth barrier to travel

> Blank Character (ASCII 32) = Not Applicable (Feature is not a Special Type)

ReqID-2728   TIGER data ingest SHALL accept the *Key to metadata record* as the foreign key of the **RT-M** record identifying the means code for the 0-cell.

3.1.1.3 Record Type 1 - One-Cell Record

Record Type 1 (**RT-1**) (numeric one) record defines a unique 1-cell (line or chain) in the TIGER files. A *chain* is a non-intersecting line or line segment that explicitly references left and right sides and start and end nodes. The record contains address ranges and ZIP Codes® (for most areas of the country with a city style address). The **RT-1** is used as the building block in TIGER polygons, which define areal features such as Geographic Entities and Area Landmarks. **RT-1** is a primary record type in the TIGER files.

Figure 3.1.1.3 illustrates TIGER one-cells, or lines. The one-cells are defined by the *FROM* and *TO* nodes shown in Figure 3.1.1.2. Notice that the direction of Line 3 is reversed from that of Line 2. Though this is only an artifact of the way in which the segments were captured, it does define the *RIGHT SIDE* and *LEFT SIDE* attributes of the lines, as well as the ordering of the address ranges. Note: each 1-cell in the figure would be defined in a separate **RT-1** record within a single **RT-1 File**.

Defining One Cells		
Line #	*FROM* Node	*TO* Node
Line 1	Node A	Node B
Line 2	Node B	Node C
Line 3	Node D	Node C
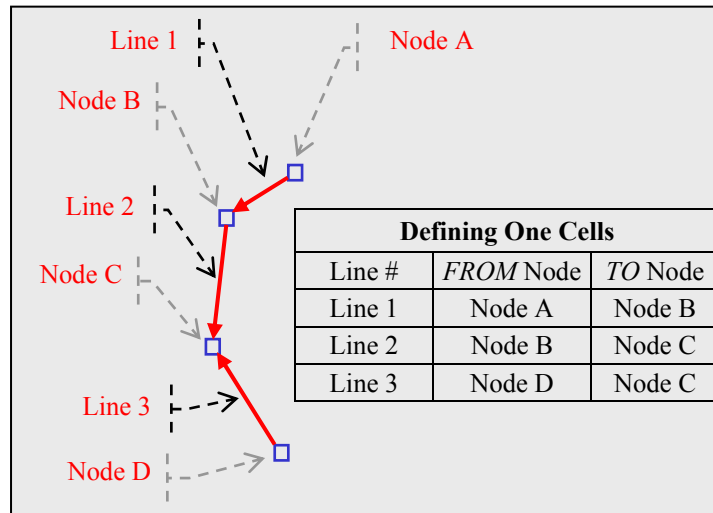
Figure 3.1.1.3 One-cells in Southbound Files

3.1.1.3.1 Purpose

ReqID-7411   TIGER data ingest SHALL accept an **RT-1** record, defining a 1-cell (line or chain) in the TIGER files.

ReqID-7412   TIGER data ingest SHALL accept one **RT-1** record for each 1-cell in the county TIGER data.

> A **RT-1** record identifies a 1-cell comprising one chain of the **RT-P** polygon, when referenced by an **RT-P** *Key(x) to 1-cell record.*

> A **RT-1** record identifies the 1-cell associated with shape points, when back referenced by a **RT-S** *Back-pointing record ID*.

> A **RT-1** record identifies the 1-cell associated with feature characteristics, when back referenced by a **RT-C** *Back-pointing record ID*.

> A **RT-1** record identifies the 1-cell associated with related names and/or address ranges, when back referenced by an **RT-R** *Back- pointing record ID.*

> A **RT-1** record identifies the 1-cell associated with an address range, when back referenced by an **RT-A** *Key to feature record.*

> A **RT-1** record identifies the 1-cell associated with non-Census ID(s), when back referenced by an **RT-I** *Back-pointing record ID.*

3.1.1.3.2 Record Format

ReqID-7461   TIGER data ingest SHALL accept the **RT-1 File** consisting of multiple **RT-1** records, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-5550   TIGER data ingest SHALL accept the **RT-1** record layout defined in Table 3.1.1.3.

Table 3.1.1.3 Record Layout for Record Type 1

Description	Field	BV	Fmt	Type	Beg	End	Len
Record key	oneCellRecID	No	L	A	1	17	17
Census feature class code	CFCC	No	L	A	18	18	1
Delete/Keep flag	DKFLAG	No	L	A	19	19	1
Key FROM zero-cell record	FREC_0_KEY	No	L	A	20	36	17
Key TO zero-cell record	TREC_0_ KEY	No	L	A	37	53	17
Key to shape coordinates record	REC_S_KEY	Yes	L	A	54	70	17
Key to name and address relationship record	REC_R_ KEY	Yes	L	A	71	87	17
Key to characteristics record	REC_C_KEY	Yes	L	A	88	104	17
Key to non-census IDs record	REC_I_ KEY	Yes	L	A	105	121	17
Area landmark boundary flag	AREA	No	L	A	122	122	1
Boundary dependency flag	DEPEND	Yes	L	A	123	123	1
Boundary Fidelity Maintenance Flag	BFMF	Yes	L	A	124	124	1
Key to metadata record	MID	No	L	A	125	141	17

3.1.1.3.3 Data Element Dictionary

ReqID-11918   TIGER data ingest SHALL accept **RT-1** data elements, as identified in this section.

ReqID-12868   TIGER data ingest SHALL accept the ***Record key*** as the **RT-1** foreign key, defined as follows:

> 1 (one) character ***Record type*** (the value is always numeric "1" in this record type)

> 10 (ten) character ***Record ID*** code

> 6 (six) character ***Date*** (date the file was created, YYMMDD format)

ReqID-12872   The ten-character ***Record ID*** code within the ***Record key*** SHALL represent the permanent TIGER 1-cell ID code (TLID).

ReqID-2731   TIGER data ingest SHALL accept the ***Census feature class code*** that identifies the feature class.

ReqID-13374   The value of the ***Census feature class code*** (CFCC) SHALL be as follows:

> A = Road Feature

> B = Rail Feature

> C = Miscellaneous Transportation Feature

> D = Landmark Feature

> E = Physical Feature

> F = Non-visible Feature

> H = Hydrographic Feature

> W = Pedestrian Walkway Feature

ReqID-2732   TIGER data ingest SHALL accept the ***Delete/Keep flag*** as an indicator as to whether the 1-cell may be deleted during processing.

ReqID-13384   The value of the ***Delete/Keep flag*** SHALL be as follows:

D = The feature may be deleted during Feature Improvement, if it is not matched with source data.

K = The feature may NOT be deleted, even if it is not matched with source data.

T = The feature may be deleted only for a topological change to "match" to another feature. If not matched, the feature may NOT be deleted.

ReqID-13387　The default value of the Delete/Keep flag SHALL be "K".

ReqID-2851　TIGER data ingest SHALL accept the *Key to FROM zero-cell record* as a foreign key to the *Record key* of the **RT-0** that provides the geocoordinates for **RT-1**'s *From* node.

ReqID-7424　TIGER data ingest SHALL accept the *Key to TO zero-cell record* as a foreign key to the *Record key* of the **RT-0** that provides the geocoordinates for **RT-1**'s *To* node.

ReqID-14292　TIGER data ingest SHALL accept the *Key to shape coordinates record* as a foreign key to the *Record key* of the **RT-S** that provides shape points for the 1-cell.

ReqID-2735　TIGER data ingest SHALL accept the *Key to name and address relationship record* as a foreign key to the *Record key* of the **RT-R** that identifies the key to the name and/or left/right side address ranges of the 1-cell.

ReqID-13370　TIGER data ingest SHALL accept the *Key to characteristics record* as a foreign key to the *Record key* of the **RT-C** that identifies feature characteristics for the 1-cell.

ReqID-2736　TIGER data ingest SHALL accept the *Key to non-census IDs record* as a foreign key to the *Record key* of the **RT-I** that identifies any non-Census IDs.

ReqID-13114　TIGER data ingest SHALL accept the *Area landmark boundary flag* that defines if the 1-cell is part of an area landmark boundary.

ReqID-13128　The value of the *Area landmark boundary flag* SHALL be as follows:

Y = the 1-cell is part of an area landmark boundary

N = the 1-cell is NOT part of an area landmark boundary

ReqID-13388　The default value of the *Area landmark boundary flag* SHALL be "N".

ReqID-13115　TIGER data ingest SHALL accept the *Boundary dependency flag* that defines if the 1-cell has a boundary dependency.

ReqID-13131　The value of the *Boundary dependency flag* SHALL be as follows:

Y = the 1-cell is a boundary that is part of a boundary dependency

(Meaning that if the 1-cell feature is moved, the boundary must move with it.)

N = the 1-cell is a boundary that is NOT part of a boundary dependency

(Meaning that the boundary does NOT move, even if the 1-cell is moved. In this case, the 1-cell is moved, and a new non-visible line is added to retain the boundary line.)

Blank indicates that the 1-cell is not a boundary.

ReqID-13389　The default value for the *Boundary dependency flag* SHALL be blank.

ReqID-13371　TIGER data ingest SHALL accept the *Boundary fidelity maintenance flag* as identifying the criticality of maintaining the shape of the linear feature during accuracy improvement.

ReqID-13372   The value of the *Boundary fidelity maintenance flag* SHALL be as follows:

> Y = this 1-cell is part of a boundary with a boundary fidelity maintenance requirement, placing requirements on MTAIP improvement processing

> N = this 1-cell is part of a boundary with no boundary fidelity maintenance requirements

> Blank indicates that the 1-cell is not a boundary.

ReqID-13397   The default value for the *Boundary fidelity maintenance flag* SHALL be blank.

ReqID-7422   TIGER data ingest SHALL accept the *Key to metadata record* as a foreign key to the *Record key* of the **RT-M** record identifying the means code for the position and shape of the 1-cell.

3.1.1.4 Record Type S - Shape Coordinates Record

Record Type S (RT-S) provides an additional series of latitude and longitude coordinate values describing the shape of each complete chain in **RT-1** records that is not a straight-line. That is, not all

complete chains in **RT-1** records have shape points and therefore not all have associated **RT-S** records. **RT-S** records may have a many-to-one relationship with a **RT-1** record. Shape points within an **RT-S** record are ordered sequentially from the *FROM* Node to the *TO* Node.

Figure 3.1.1.4 illustrates TIGER shape points, oriented from Node B (*FROM* Node) to Node C (*TO* Node), in an enlarged view of Line 2 from Figure 3.1.1.3.

Note: All shape points in the figure are defined in a single record.
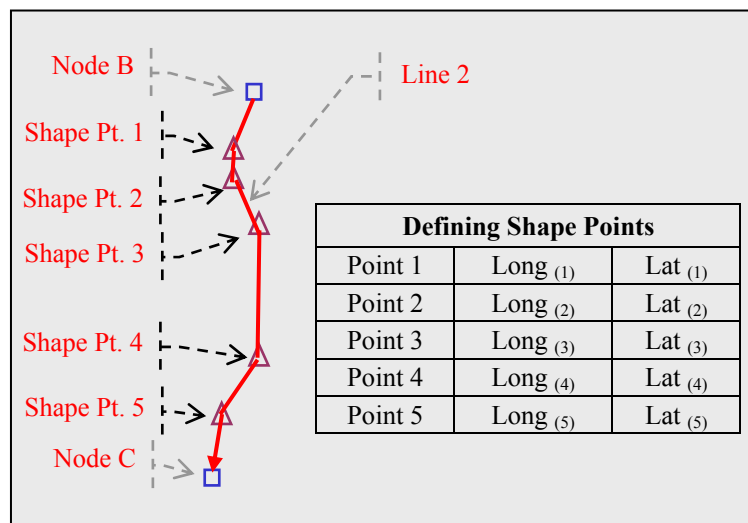
Figure 3.1.1.4 Shape Points in Southbound Files

3.1.1.4.1 Purpose

A **RT-S** record provides the shape coordinates for a 1-cell line feature when referenced by a **RT-1** *Key to shape coordinates record*.

ReqID-7600   TIGER data ingest SHALL accept **RT-S** records identifying sequential shape points for a referencing **RT-1** 1-cell, providing shape to the chain.

ReqID-7602   TIGER data ingest SHALL accept multiple **RT-S** records when a 1-cell complete chain contains more than 10 shape points.

3.1.1.4.2 Record Format

ReqID-7607   TIGER data ingest SHALL accept the **RT-S File** consisting of multiple **RT-S** records, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-6346   TIGER data ingest SHALL accept the **RT-S** record format defined in Table 3.1.1.4.

Table 3.1.1.4 Record Layout for Record Type S

Description	Field	BV	Fmt	Type	Beg	End	Len
Record key	shapeRecID	No	L	A	1	17	17
Record sequence number	shapeRecSeqNum	No	R	N	18	21	4
Back-pointing record ID	BRID	No	R	A	22	38	17
Point 1 Longitude	LONG1	No	R	N	39	49	11
Point 1 Latitude	LAT1	No	R	N	50	59	10
Point 2 Longitude	LONG2	Yes	R	N	60	70	11
Point 2 Latitude	LAT2	Yes	R	N	71	80	10
Point 3 Longitude	LONG3	Yes	R	N	81	91	11
Point 3 Latitude	LAT3	Yes	R	N	92	101	10
Point 4 Longitude	LONG4	Yes	R	N	102	112	11
Point 4 Latitude	LAT4	Yes	R	N	113	122	10
Point 5 Longitude	LONG5	Yes	R	N	123	133	11
Point 5 Latitude	LAT5	Yes	R	N	134	143	10
Point 6 Longitude	LONG6	Yes	R	N	144	154	11
Point 6 Latitude	LAT6	Yes	R	N	155	164	10
Point 7 Longitude	LONG7	Yes	R	N	165	175	11
Point 7 Latitude	LAT7	Yes	R	N	176	185	10
Point 8 Longitude	LONG8	Yes	R	N	186	196	11
Point 8 Latitude	LAT8	Yes	R	N	197	206	10
Point 9 Longitude	LONG9	Yes	R	N	207	217	11
Point 9 Latitude	LAT9	Yes	R	N	218	227	10
Point 10 Longitude	LONG10	Yes	R	N	228	238	11
Point 10 Latitude	LAT10	Yes	R	N	239	248	10

3.1.1.4.3 Data Element Dictionary

ReqID-11927   TIGER data ingest SHALL accept **RT-S** data elements, as identified in this section.

ReqID-13039   TIGER data ingest SHALL accept the *Record key* as the **RT-S** foreign key, defined as follows:

> 1 (one) character *Record type* (the value is always "S" in this record type)

> 10 (ten) character *Record ID* code (the value is the same as the Record ID code for the referencing 1-cell line feature).

> 6 (six) character *Date* (date the file was created, YYMMDD format)

ReqID-2881   The value of the 10-character record ID code within the **RT-S** *Record key* SHALL be the same as the value of the Record ID code for the referencing **RT-1** record (the1-cell TLID).

ReqID-7610   When a 1-cell complete chain contains more than 10 shape points, then multiple **RT-S** records SHALL be used for additional shape points.

ReqID-11913   Each additional **RT-S** record SHALL have the same *Record key*.

ReqID-11914   Each additional **RT-S** record SHALL increment the *Record sequence number*.

ReqID-13459   The value of the first *Record sequence number* in a **RT-S** record sequence SHALL be "0001".

ReqID-14294   TIGER data ingest SHALL accept the ***Back-pointing record ID*** as the foreign key of the referencing **RT-1**.

ReqID-7614   TIGER data ingest SHALL accept ***Point (x) Longitude*** and ***Point (x) Latitude*** identifying the geocoordinates of each shape point, formatted per 3.1.1.1.5.

ReqID-7615   The ordering of shape points SHALL be from the 1-cell's *FROM* Node to the *TO* Node.

ReqID-7616   When multiple **RT-S** records are required, Point 1 of the second record SHALL be the 11th shape point on the 1-cell (and so on).

ReqID-13463   When all Shape Points have been defined, all remaining fields within the record SHALL be blank-filled.

3.1.1.5 Record Type P - Polygon Boundary Record

Record Type P (RT-P) defines a polygon, constructed from one or more adjoining complete chains that close on the point of origin. The **RT-P** record defines the boundaries of a **RT-K** Area Landmark and a **RT-G** Geographic Entity.

Figure 3.1.1.5 illustrates a TIGER polygon defined by the lines in Figure 3.1.1.3 (and others). The figure also shows a "hole" in the polygon. In the table, the segment (Seg.) column indicates the ordering of the segments within the RT-P record. The direction (Dir.) indicates the direction of the 1-cell (FROM node to TO node, or TO node to FROM node) and defines the 1-cell as part of the external boundary or an interior hole.

Note: All lines defining the polygon are defined in a single **RT-P** record in the **RT-P File**.

Defining Polygon Boundaries		
Seg.	Dir.*	1-cell
1	A	Line 1
2	A	Line 2
3	B	Line 3
4	B	Line 10
5	A	Line 17
6	A	Line 6
7	D	Line 19
8	C	Line 14
9	C	Line 13
10		

* Refer to ReqID-13443 (3.1.1.5.3 Data Element Dictionary) for an explanation of the Direction (Dir.) value domain.
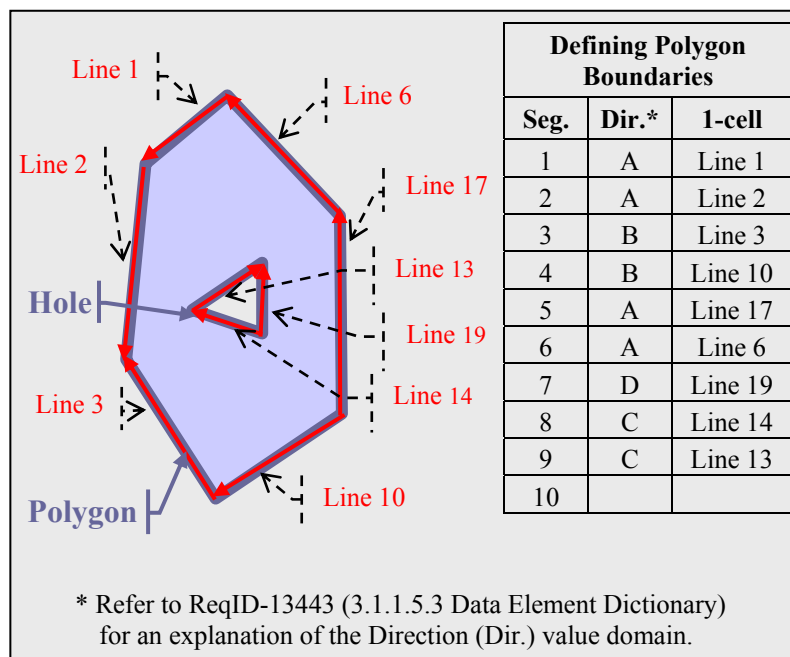
Figure 3.1.1.5 Polygon Boundaries in Southbound Files

A polygon boundary record may define more than one polygon (if needed to define the boundaries of the Area Landmark or the Geographic Entity). The record may also define a hole within the polygon, indicating that the landmark or entity does not include the area within the hole. RT-P records will define holes within a given polygon before a new polygon is defined.

3.1.1.5.1 Purpose

ReqID-7582   TIGER data ingest SHALL accept the **RT-P** record, defining a polygon in the TIGER files.

         A **RT-P** record defines the bounding polygon of a **RT-K** Area Landmark, when referenced by a **RT-K** ***Key to polygon boundary record.***

         A **RT-P** record defines the bounding polygon of the **RT-G** Geographic Entity, when referenced by a **RT-G** ***Key to polygon boundary record.***

ReqID-7588   TIGER data ingest SHALL accept multiple **RT-P** records when a polygon is defined by more than 10 1-cells.

3.1.1.5.2 Record Format

ReqID-7585   TIGER data ingest SHALL accept the **RT-P File** consisting of multiple **RT-P** records, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-6215   TIGER data ingest SHALL accept the **RT-P** record layout defined in Table 3.1.1.5.

Table 3.1.1.5 Record Layout for Record Type P

Description	Field	BV	Fmt	Type	Beg	End	Len
Record key	polyToBndyRecID	No	L	A	1	17	17
Record sequence number	polyRecSeqNum	No	R	N	18	21	4
Key1 direction flag	KEY1_DIR_FLAG	No	L	A	22	22	1
Key1 to one-cell record	REC_1_KEY1	No	L	A	23	39	17
Key2 direction flag	KEY2_DIR_FLAG	Yes	L	A	40	40	1
Key2 to one-cell record	REC_1_KEY2	Yes	L	A	41	57	17
Key3 direction flag	KEY3_DIR_FLAG	Yes	L	A	58	58	1
Key3 to one-cell record	REC_1_KEY3	Yes	L	A	59	75	17
Key4 direction flag	KEY4_DIR_FLAG	Yes	L	A	76	76	1
Key4 to one-cell record	REC_1_KEY4	Yes	L	A	77	93	17
Key5 direction flag	KEY5_DIR_FLAG	Yes	L	A	94	94	1
Key5 to one-cell record	REC_1_KEY5	Yes	L	A	95	111	17
Key6 direction flag	KEY6_DIR_FLAG	Yes	L	A	112	112	1
Key6 to one-cell record	REC_1_KEY6	Yes	L	A	113	129	17
Key7 direction flag	KEY7_DIR_FLAG	Yes	L	A	130	130	1
Key7 to one-cell record	REC_1_KEY7	Yes	L	A	131	147	17
Key8 direction flag	KEY8_DIR_FLAG	Yes	L	A	148	148	1
Key8 to one-cell record	REC_1_KEY8	Yes	L	A	149	165	17
Key9 direction flag	KEY9_DIR_FLAG	Yes	L	A	166	166	1
Key9 to one-cell record	REC_1_KEY9	Yes	L	A	167	183	17
Key10 direction flag	KEY10_DIR_FLAG	Yes	L	A	184	184	1
Key10 to one-cell record	REC_1_KEY10	Yes	L	A	185	201	17

3.1.1.5.3 Data Element Dictionary

ReqID-11925   TIGER data ingest SHALL accept **RT-P** data elements, as identified in this section.

ReqID-13033   TIGER data ingest SHALL accept the *Record key* as the **RT-P** foreign key, defined as follows:

> 1 (one) character *Record type* (the value is always "P" in this record type)

> 10 (ten) character *Record ID* code

> 6 (six) character *Date* (date the file was created, YYMMDD format)

ReqID-7594   When a boundary is comprised of more than 10 1-cells, multiple **RT-P** records SHALL be used for additional 1-cells.

ReqID-11911   Each additional **RT-P** record SHALL have the same *Record key*.

ReqID-11912   Each additional **RT-P** record SHALL increment the *Record sequence number*.

ReqID-13440 The value of the first **Record Sequence Number** in a **RT-P** record sequence SHALL be "0001".

ReqID-13442 TIGER data ingest SHALL accept the **Key(x) direction** to indicate the type and direction of the following 1-cell, in its position within the polygon or the hole.

ReqID-13443 The value of **Key(x) direction** SHALL be as follows:

> A = The 1-cell is a segment of the boundary of a polygon, and the direction of the segment is from the 1-cell's *FROM* node to the *TO* node.

> B = The 1-cell is a segment of the boundary of a polygon, and the direction of the segment is from the 1-cell's *TO* node to the *FROM* node.

> C = The 1-cell is a segment of a hole inside a polygon, and the direction of the 1-cell within the hole boundary is from the 1-cell's FROM node to the TO node.

> D = The 1-cell is a segment of a hole inside a polygon, and the direction of the 1-cell within the hole boundary is from the 1-cell's TO node to the FROM node.

> Figure 3.1.1.5 illustrates A and B directional 1-cells forming the perimeter of the depicted polygon, with C and D directional 1-cells forming the hole within a polygon.

ReqID-7597 TIGER data ingest SHALL accept the **Key(x) to one-cell record** as the foreign key of the **RT-1** segments that define the boundaries of the polygon.

ReqID-13450 The first **Key(x) to one-cell record** SHALL identify the first portion of the boundary of a polygon (positioned *FROM-TO* or *TO-FROM*, according to the value of the **Key(x) direction**, above).

ReqID-13451 Each additional **Key(x) to one-cell record** SHALL identify a sequential portion of the boundary (also positioned *FROM-TO* or *TO-FROM*, according to the value of the **Key(x) direction**, above).

ReqID-13452 A polygon SHALL be considered closed when the second node of a 1-cell is coincident with the first node of the 1-cell that started the polygon (ref. Figure 3.1.1.5).

ReqID-13456 TIGER data ingest SHALL accept polygonal holes within a defined polygon.

ReqID-13457 Interior polygonal holes SHALL be defined as per above.

ReqID-13458 An interior polygonal hole SHALL be considered closed when the second node of a 1-cell is coincident with the first node of the 1-cell that started the polygonal hole.

ReqID-13586 Holes within a given polygon SHALL be defined before any additional polygons are defined in the RT-P record.

ReqID-13453 TIGER data ingest SHALL accept additional polygons within the same **RT-P** record, if the additional polygons form part of the same area landmark or geographic entity.

ReqID-13454 Each additional polygon SHALL be defined as per above.

ReqID-13455 The additional polygon SHALL be considered closed when the second node of a 1-cell is coincident with the first node of the 1-cell in the new polygon.

ReqID-7617 When two **RT-P** records are required, Key 1 of the second record SHALL be the foreign key of the 11th **RT-1** in the sequence around the polygon (and likewise if 3 or more **RT-P** records are required).

ReqID-13462 When all 1-cells within the polygon have been defined, all remaining fields within the record SHALL be "blank-filled".

3.1.1.6 Record Type G - Geographic Entities Record

Record Type G (**RT-G**) identifies individual Geographic Entities such as the current or Census 2000 U.S. Census Bureau geographic area codes for specified maintained legal and/or statistical entities such as incorporated places and American Indian reservations. There is one **RT-G** record for each geographic entity. A special ***Boundary Fidelity Maintenance Flag*** indicates which entities must have their detailed and overall shape fidelity maintained. The boundaries of the Geographic Entity are defined by a **RT-P** polygon boundary record. Note that this is not a geographic tabulation unit base (GTUB) record; only those code fields required to identify an entity are filled for each entity type.

3.1.1.6.1 Purpose

The Census Bureau will include information defining selected geographic entities in the Southbound TIGER data. When a geographic entity is provided, an associated polygon record will always be provided in the **RT-P** record. The TIGER metadata file will include a flag indicating whether the boundary is moveable or unmovable, and if movable if the boundary requires specific maintenance of shape.

The number and content of **RT-G** records is dynamic as new geographic entities are added or updated in the TIGER database.

The state and county code shown for block records (entity type b) can be different from the state and county code for the file being worked and for other entity types in a **RT-G** record. This is the result of post-census 2000 state/county boundary changes.

ReqID-7429   TIGER data ingest SHALL accept an **RT-G** record, defining a Geographic Entities associated with TIGER features.

ReqID-13328   For every entity defined in a **RT-G** record, MTAIP processing SHALL return a record in the **Spatial File for Geographic Entities**.

A **RT-G** record identifies the geographic entities associated with non-Census ID(s), when back referenced by a **RT-I** *Back-pointing record ID*.

3.1.1.6.2 Record Format

ReqID-7457   TIGER data ingest SHALL accept the **RT-G File** consisting of multiple **RT-G** records, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-5672   TIGER data ingest SHALL accept the **RT-G** record layout defined in Table 3.1.1.6-1.

Table 3.1.1.6-1 Record Layout for Record Type G

Description	Field	BV	Fmt	Type	Beg	End	Len
Record key	geoRecID	No	L	A	1	17	17
Entity type flag	ENTITY	No	L	A	18	18	1
State FIPS	STATE	Yes	L	N	19	20	2
County FIPS	COUNTY	Yes	L	N	21	23	3
Census tract code	TRACT	Yes	L	N	24	29	6
Census block code	BLOCK	Yes	L	N	30	33	4
County subdivision FIPS	COSUB	Yes	L	N	34	38	5
Subbarrio FIPS	SUBMCD	Yes	L	N	39	43	5
Consolidated City FIPS	CONCIT	Yes	L	N	44	48	5
Place FIPS code	PLACE	Yes	L	N	49	53	5
American Indian Area/ Alaska Native Area/ Hawaiian Home Land	AIANHH	Yes	R	N	54	57	4

Description	Field	BV	Fmt	Type	Beg	End	Len
American Indian Trust Land/Hawaiian Home Land Indicator	AITLHHLI	Yes	L	A	58	58	1
American Indian Tribal Subdivision Area	ISA	Yes	R	N	59	61	3
Alaska Native Regional Corporation FIPS	ANRC	Yes	R	N	62	66	5
Congressional District (Current)	CDCU	Yes	L	N	67	68	2
State Legislative District (Upper Chamber)	SLDU	Yes	R	A	69	71	3
State Legislative District (Lower Chamber)	SLDL	Yes	R	A	72	74	3
Voting District (Current)	VTD	Yes	R	A	75	80	6
Unified school district	UNSD	Yes	R	N	81	85	5
Secondary school district	SCSD	Yes	R	N	86	90	5
Elementary school dist	ELSD	Yes	R	N	91	95	5
Urban Growth Area	UGA	Yes	R	N	96	100	5
Traffic Analysis Zone ID	TAZ	Yes	R	A	101	106	6
Boundary Fidelity Maintenance Flag	BFMF	Yes	R	A	107	107	1
Key to polygon boundary list record	REC_P_KEY	Yes	R	A	108	124	17
Key to name and address relationship record	REC_R_KEY	Yes	R	A	125	141	17
Key to non-census ID record	REC_I_KEY	Yes	R	A	142	158	17
Key to metadata record	MID	Yes	R	A	159	175	17

3.1.1.6.3 Data Element Dictionary

ReqID-11919   TIGER data ingest SHALL accept **RT-G** data elements, as identified in this section.

ReqID-12874   TIGER data ingest SHALL accept the ***Record key*** as the **RT-G** foreign key, defined as follows:

> 1 (one) character ***Record type*** (the value is always "G" in this record type)

> 10 (ten) character ***Record ID*** code

> 6 (six) character ***Date*** (date the file was created, YYMMDD format)

ReqID-13313   TIGER data ingest SHALL accept the ***Entity type*** field, identifying the type of geographic entity represented by the record, as defined below.

ReqID-13327   Acceptable values of ***Entity type*** SHALL be as defined below:

> b = Census 2000 block

> C = County or equivalent entity

> G = Consolidated city

> I = American Indian area

> K = Traffic analysis zone

> L = Subbarrio

> M = County subdivision

P = Place

W = Alaska Native Regional Corporation

X = American Indian tribal subdivision

Y = Urban growth area

1 = Current congressional district

3 = Unified school district

4 = Secondary school district

5 = Elementary school district

7 = Voting district

8 = State legislative district (upper chamber)

9 = State legislative district (lower chamber)

Different geographic *Entity types* require associated entity data for MTAIP processing.

ReqID-13433 TIGER data ingest SHALL accept selected entity fields in a **RT-G** record, depending on the *Entity type* defined in the record.

ReqID-13434 Entity data accompanying specific *Entity types* SHALL be as defined in Table 3.1.1.6-2.

Table 3.1.1.6-2 Entity Types and Accompanying Entity Fields

Entity Type	Entity Name	Entity Fields
Entity type b	Census 2000 block	STATE, COUNTY, TRACT, BLOCK
Entity type C	County or equivalent entity	STATE, COUNTY
Entity type G	Consolidated city	STATE, CONCIT
Entity type I	American Indian area	AIANHH, AITLHHLI
Entity type K	Traffic analysis zone	STATE, COUNTY, TAZ
Entity type L	Subbarrio	STATE, COUNTY, COSUB, SUBMCD
Entity type M	County subdivision	STATE, COUNTY, COSUB
Entity type P	Place	STATE, PLACE
Entity type W	Alaska Native Regional Corporation	STATE, ANRC
Entity type X	American Indian tribal subdivision	AIANHH, ISA
Entity type Y	Urban growth area	STATE, UGA
Entity type 1	Current congressional district	STATE, CDCU
Entity type 3	Unified school district	STATE, UNSD
Entity type 4	Secondary school district	STATE, SCSD
Entity type 5	Elementary school district	STATE, ELSD
Entity type 7	Voting district	STATE, COUNTY, VTD
Entity type 8	State legislative district (upper chamber)	STATE, SLDU
Entity type 9	State legislative district (lower chamber)	STATE, SLDL

ReqID-7444 TIGER data ingest SHALL accept the *State (FIPS)* field identifying the two-digit state or equivalent entity FIPS 5 code, as specified in the Federal Information Processing Standards.

ReqID-7445 TIGER data ingest SHALL accept the *County (FIPS)* field identifying the three-digit county or equivalent entity FIPS 6 code.

ReqID-13309   TIGER data ingest SHALL accept the **Census Tract** field containing the concatenated four-digit census tract basic and two-digit census tract suffix codes, with leading and ending zeroes to fill the field.

ReqID-13310   TIGER data ingest SHALL accept the **Census Block** field identifying the four-digit census block code.

ReqID-7446   TIGER data ingest SHALL accept the **County Subdivision (FIPS)** identifying the five-digit county subdivision FIPS 55 code.

ReqID-7447   TIGER data ingest SHALL accept the **Subbarrio (FIPS**) field identifying the five-digit subbarrio FIPS 55 code (applicable only in Puerto Rico).

ReqID-13311   TIGER data ingest SHALL accept the **Consolidated City (FIPS)** field identifying the five-digit Consolidated City FIPS 55 code.

ReqID-13312   TIGER data ingest SHALL accept the **Place (FIPS)** field identifying the five-digit Place FIPS 55 code.

ReqID-7448   TIGER data ingest SHALL accept the **American Indian Area/Alaska Native Area/Hawaiian Home Land (Census)** field identifying the four-digit Census Bureau code for an American Indian area/Alaska Native village statistical area, or Hawaiian home land.

ReqID-7449   TIGER data ingest SHALL accept the American Indian Trust Land/Hawaiian Home Land Indicator (AITLHHLI) Flag field providing a one-digit flag.

ReqID-13470   The **AITLHHLI Flag** SHALL be encoded as follows:

        T = Tribal trust land

        I = Individual trust land

        H = Hawaiian home land

ReqID-13589   TIGER data ingest SHALL accept a blank value to indicate that the geographic entity is not an American Indian Trust Land or Hawaiian Home Land.

ReqID-14303   TIGER data ingest SHALL further interpret a blank value in the **AITLHHLI Flag** as follows:

        When the **Entity Type** is I (indicating that the geographic entity is an American Indian area), a blank value in the AITLHHLI Flag indicates that the geographic entity is a reservation or reservation equivalent (American Indian reservation, Oklahoma tribal statistical area (OTSA), tribal designated statistical area (TDSA), Alaska Native village statistical area (ANVSA), or state designated American Indian statistical area (SDAISA)).

        When the **Entity Type** is any value other than I (indicating that the geographic entity is NOT an American Indian area), a blank value in the AITLHHLI Flag is not applicable and has no significance.

ReqID-7450   TIGER data ingest SHALL accept the **American Indian Tribal Subdivision (Census)** field identifying the three-digit Census American Indian Tribal Subdivision code.

ReqID-7451   TIGER data ingest SHALL accept the **Alaska Native Regional Corporation** field identifying the five-digit Alaska Native Regional Corporation 55 code.

ReqID-13314   TIGER data ingest SHALL accept the **Congressional District** (**Current**) field identifying the two-digit FIPS 9 congressional district code of the current district.

ReqID-13315   TIGER data ingest SHALL accept the *State Legislative District (Upper Chamber)* field identifying the up to three-character state legislative district (upper chamber) code.

ReqID-13323   TIGER data ingest SHALL accept the *State Legislative District (Lower Chamber)* field identifying the up to three-character state legislative district (lower chamber) code.

ReqID-13324   TIGER data ingest SHALL accept the *Voting District (Current)* field identifying the up to six-character current voting district code.

ReqID-7454   TIGER data ingest SHALL accept the *Unified school district* field containing the five-digit Department of Education (DOE) unified school district code.

ReqID-7453   TIGER data ingest SHALL accept the *Secondary school district* field containing the five-digit Department of Education (DOE) secondary school district code.

ReqID-7455   TIGER data ingest SHALL accept the *Elementary school district* field containing the five-digit Department of Education (DOE) elementary school district code.

ReqID-7452   TIGER data ingest SHALL accept the *Urban Growth Area* field identifying the five-digit Census urban growth area code, if applicable.

ReqID-13325   TIGER data ingest SHALL accept the *Traffic Analysis Zone* field identifying the up to six-character census traffic analysis zone code.

ReqID-13326   TIGER data ingest SHALL accept the *Entity Name-Legal/Statistical Area Description* field identifying the concatenated name and expanded legal/statistical area description using the non-state specific specifications as used for the Data Access and Dissemination System (DADS); e.g., Gadsden County, State Legislative District 62, Seat Pleasant town, etc.)

ReqID-13427   TIGER data ingest SHALL accept the *Boundary Fidelity Maintenance Flag* field identifying if this entity requires shape fidelity maintenance and with legal values.

ReqID-13428   Values for the *Boundary Fidelity Maintenance Flag* SHALL be as follows:

   Y = Boundary shape fidelity at the entity and 2-cell level required for this entity

   N = Boundary shape fidelity at the entity and 2-cell level not required for this entity

ReqID-2746   TIGER data ingest SHALL accept the *Key to polygon boundary list record* as the foreign key of the **RT-P** record(s), providing definition of the 1-cells that comprise the geographic entity.

ReqID-13548   TIGER data ingest SHALL accept the *Key to name and address relationship record* as the foreign key of the **RT-R** record(s) identifying the key to the name(s) of the geographic entity.

ReqID-2747   TIGER data ingest SHALL accept the *Key to metadata record* as the foreign key of the **RT-M** Metadata record identifying the means code.

3.1.1.7 Record Type K - Area Landmark Feature Record

Record Type K (**RT-K**) identifies area landmarks within the TIGER database, providing a reference to a **RT-P** record providing the bounding polygon of the area landmark. The record has a one-to-one relationship with the **RT-R** Name and Address Relationship Record - if the Area Landmark Feature has associated names.

3.1.1.7.1 Purpose

ReqID-7568   TIGER data ingest SHALL accept the **RT-K** record, defining Area Landmark features in the TIGER files.

ReqID-7569   TIGER data ingest SHALL accept one **RT-K** record for every Area Landmark feature in the partitioned TIGER data.

A **RT-K** record identifies the area landmark associated with non-Census ID(s), when back referenced by a **RT-I** *Back-pointing record ID*.

3.1.1.7.2 Record Format

ReqID-7571   TIGER data ingest SHALL accept the **RT-K File** consisting of multiple **RT-K** records, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-6129   TIGER data ingest SHALL accept the **RT-K** record layout defined in Table 3.1.1.7.

Table 3.1.1.7 Record Layout for Record Type K

Description	Field	BV	Fmt	Type	Beg	End	Len
Record key	areaLandmarkRecID	No	L	A	1	17	17
Census feature class code	CFCC	Yes	L	A	18	18	1
Key to polygon boundary record	REC_P_ KEY	Yes	L	A	19	35	17
Key to name and address relationship record	REC_R_ KEY	Yes	L	A	36	52	17
Key to characteristics record	REC_C_KEY	Yes	L	A	53	69	17
Key to metadata record	MID	Yes	L	A	70	86	17

3.1.1.7.3 Data Element Dictionary

ReqID-11924   TIGER data ingest SHALL accept **RT-K** data elements, as identified in this section.

ReqID-12969   TIGER data ingest SHALL accept the *Record key* as the **RT-K** foreign key, defined as follows:

1 (one) character *Record type* (the value is always "K" in this record type)

10 (ten) character *Record ID* code (The 10-digit Record ID represents a non-permanent Area Landmark ID intended for reference purposes when the Northbound file is returned to the Census Bureau.)

6 (six) character *Date* (date the file was created, YYMMDD format)

ReqID-7575   TIGER data ingest SHALL accept the *Census feature class code* (CFCC) identifying the feature class.

ReqID-2876   TIGER data ingest SHALL accept the *Key to polygon boundary record* as the foreign key to the **RT-P** record(s) defining the boundaries of the Area Landmark.

ReqID-7578   TIGER data ingest SHALL accept the *Key to name and address relationship record* as the foreign key to the **RT-R** record(s) identifying the key to the name(s) of the Area Landmark.

ReqID-13402   TIGER data ingest SHALL accept the *Key to characteristics record* as the foreign key to the **RT-C** record identifying the characteristics of the area.

ReqID-7579   TIGER data ingest SHALL accept the *Key to metadata record* as the foreign key to the **RT-M** Metadata record identifying the means code for the Area Landmark.

3.1.1.8 Record Type L - Point Feature Record

Record Type L (**RT-L**) identifies and provides geocoordinates for Point Landmark Features. Landmarks refer to cartographic or locational landmarks, primarily identified for use by an enumerator while working in the field. The record has a one-to-one relationship with the **RT-R** Name and Address Relationship Record – if the Point Feature has associated names and/or addresses.

3.1.1.8.1 Purpose

ReqID-7532 TIGER data ingest SHALL accept the **RT-L** record, providing geocoordinates for every Point Feature.

ReqID-7538 TIGER data ingest SHALL accept one **RT-L** record for every Point Feature in the partitioned TIGER data.

A **RT-L** record identifies the point landmark associated with non-Census ID(s), when back referenced by a **RT-I** *Back-pointing record ID*.

3.1.1.8.2 Record Format

ReqID-7536 TIGER data ingest SHALL accept the **RT-L File** consisting of multiple **RT-L** records, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-6043 TIGER data ingest SHALL accept the **RT-L** record layout identified in Table 3.1.1.8.

Table 3.1.1.8 Record Layout for Record Type L

Description	Field	BV	Fmt	Type	Beg	End	Len
Record key	PointfeatureRecID	No	L	A	1	17	17
Census feature class code	CFCC	Yes	L	A	18	18	1
Point feature longitude	PFLON	Yes	R	N	19	29	11
Point feature latitude	PFLAT	Yes	R	N	30	39	10
Key to name and address relationship record	REC_R_ KEY	Yes	L	A	40	56	17
Key to characteristics record	REC_C_KEY	Yes	L	A	57	73	17
Key to metadata record	MID	Yes	R	A	74	90	17

3.1.1.8.3 Data Element Dictionary

ReqID-11923 TIGER data ingest SHALL accept **RT-L** data elements, as identified below.

ReqID-12906 TIGER data ingest SHALL accept the *Record key* as the **RT-L** foreign key, defined as follows:

1 (one) character *Record type* (the value is always "L" in this record type)

10 (ten) character *Record ID* code (The 10-digit Record ID represents a non-permanent Point Landmark ID intended for reference purposes when the Northbound file is returned to the Census Bureau.)

6 (six) character *Date* (date the file was created, YYMMDD format)

ReqID-7542 TIGER data ingest SHALL accept the *Census feature class code* (CFCC) identifying the feature class.

ReqID-7543 TIGER data ingest SHALL accept the *Point feature longitude* and *Point feature latitude* identifying the geocoordinates of the Point Feature, formatted per 3.1.1.1.5.

ReqID-7544   TIGER data ingest SHALL accept the **Key to name and address relationship record** as
                the foreign key of the **RT-R** record(s) identifying the key to the name(s) and/or
                address(es) of the Point Feature.

ReqID-13401   TIGER data ingest SHALL accept the **Key to characteristics** record as the foreign key of
                the **RT-C** record identifying the characteristics of the point feature.

ReqID-7555   TIGER data ingest SHALL accept the **Key to metadata record** as the foreign key of the
                RT-M Metadata record identifying the means code for the Point Feature.

3.1.1.9 Record Type C - Characteristics Record

Record Type C (RT-C) identifies characteristics associated with TIGER features. The record has many-
to-one relationships with **RT-1**, **RT-G**, **RT-K**, and **RT-L**, providing characteristics for linear features,
geographic entities, area landmarks, and point landmarks, respectively.

3.1.1.9.1 Purpose

The **RT-C** record provides feature characteristics for linear, area, and point features. The characteristics
in the Southbound files are used during MTAIP feature improvement processing so that features and
characteristics in the returned TIGER data in the Northbound files can be properly identified as new,
modified, or deleted information.

When characteristics are provided in a **RT-C** record, the record will have an associated *MEANS ID*. As a
RT-C record has a single *MID* field, characteristics that are associated with different *MID* values will be
provided on separate **RT-C** records.

If a feature has no associated characteristics to be provided in the Southbound data, then there will not be
an associated **RT-C** record.

ReqID-13598   TIGER data ingest SHALL accept the **RT-C** record, identifying characteristics of
                features defined in **RT-1**, **RT-G**, **RT-K**, and **RT-L**.

ReqID-13599   TIGER data ingest SHALL accept zero or more **RT-C** records for each **RT-1**, **RT-G**,
                RT-K, and **RT-L** record.

3.1.1.9.2 Record Format

The **RT-C** record has two parts: a Common portion and a Feature-type specific portion.

ReqID-13603   TIGER data ingest SHALL accept the **RT-C File** consisting of multiple **RT-C** records,
                delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-13604   TIGER data ingest SHALL accept **RT-C** records having a length of 89 characters, with
                no delimiters.

ReqID-13605   TIGER data ingest SHALL accept **RT-C** records composed of two parts: a *Common
                portion* and a *Feature-type specific portion*.

3.1.1.9.2.1 Format and Data Element Description of Common Portion

Fields within the *Common portion* are the same for all feature types. One field within the *Common
portion* identifies the feature type, which identifies the fields within the *Feature-type specific portion* of
the **RT-C**.

ReqID-13608   TIGER data ingest SHALL accept the *Common portion* of a **RT-C** record identifying
                fields that are common to all TIGER feature types.

ReqID-13610   TIGER data ingest SHALL accept the **RT-C** *Common portion* record layout identified in
                Table 3.1.1.9-1.

Table 3.1.1.9-1 Record Layout for Record Type C - Common Portion

Description	Field	BV	Fmt	Type	Beg	End	Len
Record key	CharRecID	No	L	A	1	17	17
Record sequence number	CHARRECSEQ	No	R	N	18	21	4
Back-pointing record ID	BRID	No	R	A	22	38	17
Feature-type code	FEATYPE	No	L	A	39	39	1
Key to metadata	MID	No	R	A	40	56	17

ReqID-13612   TIGER data ingest SHALL accept **RT-C** *Common portion* data elements, as identified in this section.

ReqID-13613   TIGER data ingest SHALL accept the *Record key* as the **RT-C** foreign key, defined as follows:

> 1 (one) character *Record type* (the value is always "C" in this record type)

> 10 (ten) character *Record ID* code

> 6 (six) character *Date* (date the file was created, YYMMDD format)

ReqID-13617   When a feature has multiple values for a field in the *Characteristic* record, multiple **RT-C** records SHALL be used to identify the additional values.

ReqID-13618   Each additional **RT-C** SHALL have the same *Record key*

ReqID-13619   Each additional **RT-C** SHALL increment the *Record sequence number*.

ReqID-13620   The value of the *Record sequence number* of the first **RT-C** in a sequence SHALL be "0001".

ReqID-13621   TIGER data ingest SHALL accept the *Back-pointing record ID* as the foreign key of the referencing **RT-1**, **RT-G**, **RT-K**, or **RT-L**.

ReqID-13622   TIGER data ingest SHALL accept the *Feature type code* identifying the type of feature this **RT-C** record is describing.

ReqID-13623   Values for *Feature type code* SHALL be as follows:

> A = *Feature-type A* – Road feature

> B = *Feature-type B* – Rail feature

> C = *Feature-type C* – Miscellaneous transportation feature

> E = *Feature-type E* – Physical feature

> F = *Feature-type F* – Non-visible feature

> H = *Feature-type H* – Hydro feature

> 0 (zero) = *Feature-type 0* – Point landmarks, including point hydro features

> 2 = *Feature-type 2* – Area landmarks, including area hydro features

> W = *Feature-type W* – Pedestrian walkway feature

ReqID-13633   TIGER data ingest SHALL accept the *Key to Metadata* identifying the metadata record defining the source for the feature characteristics.

3.1.1.9.2.2 Format and Data Element Description of Feature Type A Portion

Fields within the *Feature-type A portion* of the **RT-C** record are applicable to road features, as identified in the *Feature-type code* field of the *Common portion* of the **RT-C** record. The *Feature-type A portion* will be in the same record as the *Common portion*, positioned immediately following the *Common portion*.

ReqID-13636   When the ***Feature type code*** in the *Common portion* of **RT-C** has a value of "A", TIGER data ingest SHALL accept the *Feature-type specific portion* of the **RT-C** as the *Feature-type A portion*, identifying fields associated with road features.

ReqID-13638   TIGER data ingest SHALL accept the **RT-C** *Feature-type A portion* record layout identified in Table 3.1.1.9-2.

Table 3.1.1.9-2 Record Layout for Record Type C - Feature-type A Portion

Description	Field	BV	Fmt	Type	Beg	End	Len
FROM Stack	FR_STACK	Yes	R	N	57	60	4
TO Stack	TO_STACK	Yes	R	N	61	64	4
Median width	MEDIAN	Yes	R	N	65	69	5
Road feature width	WIDTH	Yes	R	N	70	74	5
Special segment type	SPEC_SEG	Yes	R	A	75	75	1
Decked	DECKED	Yes	R	A	76	76	1
Access to road	RD_ACES	Yes	R	A	77	77	1
Traffic flow direction	RD_FLOW	Yes	R	A	78	78	1
Jurisdiction	RD_JURIS	Yes	R	A	79	79	1
Toll road	RD_TOLL	Yes	R	A	80	80	1
Number of lanes	RD_LANES	Yes	R	N	81	82	2
Embedded Rail	RD_EMBED	Yes	R	A	83	83	1
Special feature class	RD_CLASS	Yes	R	A	84	84	1
Speed limit	RD_SPEED	Yes	R	N	85	86	2
Road surface type	RD_SURF	Yes	R	A	87	87	1
Traversable median	RD_TRAV	Yes	R	A	88	88	1
Vehicular trail	RD_TRAIL	Yes	R	A	89	89	1

ReqID-13640   TIGER data ingest SHALL accept **RT-C** *Feature-type A portion* data elements, as identified in 3.1.1.9.2.2.1 through 3.1.1.9.2.2.17.

3.1.1.9.2.2.1 Road Feature Characteristic: FROM Stack

ReqID-13642   TIGER data ingest SHALL accept the ***FROM Stack*** characteristic identifying overpassing/underpassing characteristics of the FROM node of a road feature.

ReqID-13643   The ***FROM Stack*** characteristic SHALL indicate the level of the feature, relative to other linear features intersecting at that node.

ReqID-13644   Values of the ***FROM Stack*** field SHALL be as follows:

ReqID-13645   The value of ***FROM Stack*** SHALL be an integer.

ReqID-13646   A negative value SHALL indicate that the end point is below ground level.

ReqID-13647   A value of -1 SHALL indicate that the end point is a single level below ground.

ReqID-13648   A value of -2 SHALL indicate that the end point is one level below the -1 level.

ReqID-13649   A zero (0) value SHALL indicate that the end point is at ground level.

ReqID-13650   A positive value SHALL indicate that the end point is above ground level.

ReqID-13651   A value of +1 SHALL indicate that the end point is a single level above ground.

ReqID-13652   A value of +2 SHALL indicate that the end point is one level above the +1 level.

ReqID-13653   A value of +3 SHALL indicate that the end point is one level above the +2 level.

ReqID-13654   A value of +100 SHALL indicate that the level of the end point is unknown.

ReqID-13655   TIGER data ingest SHALL assume a positive value for the level, unless the value is zero (0) or has an explicit negative sign.

ReqID-13656   TIGER data ingest SHALL accept a value of +100 as the default value for the **FROM Stack** characteristic.

3.1.1.9.2.2.2 Road Feature Characteristic: TO Stack

ReqID-13658   TIGER data ingest SHALL accept the **TO Stack** characteristic identifying overpassing/underpassing characteristics of the TO node of a road feature.

ReqID-13659   The **TO Stack** characteristic SHALL indicate the level of the feature, relative to other linear features intersecting at that node.

ReqID-13660   Values of the **TO Stack** field SHALL be as follows:

ReqID-13661   The value of **TO Stack** SHALL be an integer.

ReqID-13662   A negative value SHALL indicate that the end point is below ground level.

ReqID-13663   A value of -1 SHALL indicate that the end point is a single level below ground.

ReqID-13664   A value of -2 SHALL indicate that the end point is one level below the -1 level.

ReqID-13665   A zero (0) value SHALL indicate that the end point is at ground level.

ReqID-13666   A positive value SHALL indicate that the end point is above ground level.

ReqID-13667   A value of +1 SHALL indicate that the end point is a single level above ground.

ReqID-13668   A value of +2 SHALL indicate that the end point is one level above the +1 level.

ReqID-13669   A value of +3 SHALL indicate that the end point is one level above the +2 level.

ReqID-13670   A value of +100 SHALL indicate that the level of the end point is unknown.

ReqID-13671   TIGER data ingest SHALL assume a positive value for the level, unless the value is zero (0) or has an explicit negative sign.

ReqID-13672   TIGER data ingest SHALL accept a value of +100 as the default value for the **TO Stack** characteristic.

3.1.1.9.2.2.3 Road Feature Characteristic: Median Width

ReqID-13674   TIGER data ingest SHALL accept the **Median width** characteristic indicating the width of the median of a road feature.

ReqID-13675   The value of the **Median width** field SHALL be in meters.

ReqID-13676   A value of -1 SHALL indicate that there is no median.

ReqID-13677   A value of 0 (zero) SHALL indicate that the **Median width** is unknown.

ReqID-13678   TIGER data ingest SHALL accept a value of 0 (zero) as the default value for the **Median width** characteristic.

3.1.1.9.2.2.4 Road Feature Characteristic: Road Feature Width

ReqID-13680   TIGER data ingest SHALL accept the **Road feature width** characteristic indicating the side-to-side width of the road feature.

ReqID-13681   The **Road feature width** characteristic SHALL include all continuing lanes (not including turn lanes).

ReqID-13682   The value of the **Road feature width** field SHALL be in meters.

ReqID-13683   A value of 0 (zero) SHALL indicate that the **Road feature width** is unknown.

ReqID-13684   TIGER data ingest SHALL accept a value of 0 (zero) as the default value for the **Road feature width** characteristic.

3.1.1.9.2.2.5 Road Feature Characteristic: Special Segment Type

ReqID-13686   TIGER data ingest SHALL the **Special segment type** indicating conditions of special road segment types.

ReqID-13687   Values of **Special segment type** SHALL be as follows:

> T = Tunnel. The road feature is within a tunnel.
>
> B = Bridge. The road feature is on a bridge.
>
> F = Ferry. The road feature is a ferry crossing.
>
> D = Dam. The road feature is constructed over a man-made or earthen dam.
>
> L = Levee. The road feature is constructed over a levee.
>
> U = Unknown. The **Special segment type** is not known.

ReqID-13694   The field SHALL be blank if the road feature is not one of the special segment types listed above.

ReqID-13695   TIGER data ingest SHALL accept a value of U as the default value for the **Special segment type** characteristic.

3.1.1.9.2.2.6 Road Feature Characteristic: Decked

ReqID-13697   TIGER data ingest SHALL accept the **Decked** characteristic indicating the presence of a rail or subway above or below a road feature, or a decked road.

ReqID-13698   Values of the **Decked** field SHALL be as follows:

> A = Rail above the road feature
>
> B = Rail below the road feature
>
> R = Decked road features
>
> U = Unknown

ReqID-13703   The field SHALL be blank if the road feature is not decked.

ReqID-13704   TIGER data ingest SHALL accept a value of U as the default value for the **Decked** characteristic.

3.1.1.9.2.2.7 Road Feature Characteristic: Access to Road

ReqID-13706   TIGER data ingest SHALL accept the *Access to road* characteristic indicating the availability of traffic access to the road feature.

ReqID-13707   Values of the *Access to road* field SHALL be as follows:

>   L = Limited. Access to the road feature is limited to ramps.

>   C = Controlled. Access to the road feature is limited to intersections at grade.

>   U = Unlimited. Access to the road feature is unlimited

ReqID-13711   The field SHALL be blank if the value is unknown.

ReqID-13712   TIGER data ingest SHALL accept a blank field as the default value for the *Access to road* characteristic.

3.1.1.9.2.2.8 Road Feature Characteristic: Traffic Flow Direction

ReqID-13714   TIGER data ingest SHALL accept the *Traffic flow direction* characteristic indicating the direction of traffic flow on the road feature.

ReqID-13715   Values of the *Traffic flow direction* field SHALL be as follows:

>   F = One way, from the FROM node to the TO node

>   T = One way, from the TO node to the FROM node

>   B = Two way traffic

>   V = Traffic direction varies

>   U = Unknown

ReqID-13721   TIGER data ingest SHALL accept a value of U as the default value for the *Traffic flow direction* characteristic.

3.1.1.9.2.2.9 Road Feature Characteristic: Jurisdiction

ReqID-13723   TIGER data ingest SHALL accept the *Jurisdiction* characteristic indicating the type of entity that typically maintains the road feature.

ReqID-13724   Values of the *Jurisdiction* characteristic SHALL be as follows:

>   F = Federal (e.g., roads in national parks, national forest, and other federal lands)

>   S = State (e.g., state highways, state roads, interstate highways)

>   C = County (e.g., county routes)

>   L = Local government

>   P = Private

>   T = Tribal or Bureau of Indian Affairs

>   O = Other

ReqID-13732   The field SHALL be blank if the value is unknown.

ReqID-13733   TIGER data ingest SHALL accept a blank field as the default value for the *Jurisdiction* characteristic.

3.1.1.9.2.2.10 Road Feature Characteristic: Toll Road

ReqID-13735   TIGER data ingest SHALL accept the ***Toll road*** characteristic indicating that the road feature is a toll road.

ReqID-13736   The value of the ***Toll road*** field SHALL be as follows:

> Y = Yes; the road feature is a toll road
>
> N = No; the road feature is not a toll road

ReqID-13739   The field SHALL be blank if the value is unknown.

ReqID-13740   TIGER data ingest SHALL accept a blank field as the default value for the ***Toll road*** characteristic.

3.1.1.9.2.2.11 Road Feature Characteristic: Number of Lanes

ReqID-13742   TIGER data ingest SHALL accept the ***Number of lanes*** characteristic indicating the number of travel lanes from curb-to-curb within a road feature, independent of direction of travel or special status (center turn lanes, HOV designation).

ReqID-13743   The value of the ***Number of lanes*** field SHALL be an integer, representing the number of travel lanes.

ReqID-13744   A value of 0 (zero) SHALL indicate that the ***Number of lanes*** is unknown.

ReqID-13745   TIGER data ingest SHALL accept a value of 0 (zero) as the default value for the ***Number of lanes*** characteristic.

3.1.1.9.2.2.12 Road Feature Characteristic: Embedded Rail

ReqID-13747   TIGER data ingest SHALL accept the ***Embedded Rail*** characteristic indicating the presence of a rail line embedded in a road feature.

ReqID-13748   The ***Embedded Rail*** characteristic SHALL apply only to the road feature, providing no additional information of the rail feature.

ReqID-13749   Values of the ***Embedded Rail*** field SHALL be as follows:

> B = Between lanes. The vehicular traffic flows in the same direction on both sides of the railway.
>
> M = In median. The vehicular traffic flows in opposing directions on each side of the railway.
>
> R = On roadway. The road and rail surface are integrated and road traffic can move where rail lines exist. (e.g., a trolley track).
>
> L = Embedded rail found location unknown.
>
> U = Embedded rail existence unknown.

ReqID-13754   The field SHALL be blank if the road feature is not one of the embedded rail types listed above.

ReqID-13755   TIGER data ingest SHALL accept a value of U as the default value for the ***Embedded Rail*** characteristic.

3.1.1.9.2.2.13 Road Feature Characteristic: Special Feature Class

ReqID-13757   TIGER data ingest SHALL accept the ***Special feature class*** characteristic indicating a road segment having a special use class characteristic.

ReqID-13758   Values of the ***Special feature class*** field SHALL be as follows:

        A = Alley

        D = Driveway

        L = Logging road

        O = Oilfield road

        P = Parking lot road

        R = Access ramp

        S = Service or frontage road

        T = Traffic circle

        U = Unknown

ReqID-13769   The field SHALL be blank if the road feature is not one of the special feature class types listed above.

ReqID-13770   TIGER data ingest SHALL accept a value of U as the default value for the ***Special feature class*** characteristic.

3.1.1.9.2.2.14 Road Feature Characteristic: Speed Limit

ReqID-13772   TIGER data ingest SHALL accept the ***Speed limit*** characteristic indicating the lowest speed limit within the road feature segment.

ReqID-13773   The value of the field SHALL be in miles per hour.

ReqID-13774   A value of 0 (zero) SHALL indicate that the ***Speed limit*** is unknown.

ReqID-13775   TIGER data ingest SHALL accept a value of 0 (zero) as the default value for the ***Speed limit*** characteristic.

3.1.1.9.2.2.15 Road Feature Characteristic: Road Surface Type

ReqID-13777   TIGER data ingest SHALL accept the ***Road surface type*** characteristic indicating the surface type of the road feature.

ReqID-13778   Values of the ***Road surface type*** field SHALL be as follows:

        P = Paved

        D = Dirt

        G = Gravel

        M = Mixed (Paved and other)

        U = Unknown type

ReqID-13784   TIGER data ingest SHALL accept a value of U as the default value for the ***Road surface type*** characteristic.

3.1.1.9.2.2.16 Road Feature Characteristic: Traversable Median

ReqID-13786   TIGER data ingest SHALL accept the ***Traversable median*** characteristic indicating that the road feature has a median that is traversable by emergency vehicles.

ReqID-13787   The value of the ***Traversable median*** field SHALL be as follows:

Y = Yes; the median is traversable by an emergency vehicle

N = No; the median is not traversable by an emergency vehicle

U = Unknown

ReqID-13791   The field SHALL be blank if the road feature has no median.

ReqID-13792   TIGER data ingest SHALL accept a value of U as the default value for the **Traversable median** characteristic.

3.1.1.9.2.2.17 Road Feature Characteristic: Vehicular Trail

ReqID-13794   TIGER data ingest SHALL accept the **Vehicular trail** characteristic indicating that the road feature is passable only by a 4WD vehicle.

ReqID-13795   The value of the **Vehicular trail** characteristic SHALL be as follows:

Y = Yes; the road is a vehicular trail

N = No; the road is not a vehicular trail

ReqID-13798   The field SHALL be blank if the value of the characteristic is unknown.

ReqID-13799   TIGER data ingest SHALL accept a blank field as the default value for the **Vehicular trail** characteristic.

3.1.1.9.2.3 Format and Data Element Description of Feature Type B Portion

Fields within the *Feature-type B portion* of the **RT-C** record are applicable to rail features, as identified in the **Feature-type code** field of the *Common portion* of the **RT-C** record. The *Feature-type B portion* will be in the same record as the *Common portion*, positioned immediately following the *Common portion*.

ReqID-13802   When the **Feature type code** in the *Common portion* of **RT-C** has a value of "B", TIGER data ingest SHALL accept the *Feature-type specific portion* of the **RT-C** as the *Feature-type B portion*, identifying fields associated with rail features.

ReqID-13804   TIGER data ingest SHALL accept the **RT-C** *Feature-type B portion* record layout identified in Table 3.1.1.9-3.

Table 3.1.1.9-3 Record Layout for Record Type C - Feature-type B Portion

Description	Field	BV	Fmt	Type	Beg	End	Len
FROM Stack	FR_STACK	Yes	R	N	57	60	4
TO Stack	TO_STACK	Yes	R	N	61	64	4
Blank fill	Fill 1	Yes			65	74	10
Special segment type	SPEC_SEG	Yes	R	A	75	75	1
Decked	DECKED	Yes	R	A	76	76	1
Gauge	RR_GAUGE	Yes	R	A	77	77	1
Condition of railroad grade	RR_COND	Yes	R	A	78	78	1
Mass transit rail	RR_MASS	Yes	R	A	79	79	1
Track function	RR_FUNCT	Yes	R	N	80	80	1
Blank fill	Fill 2	Yes			81	83	3
Special feature class	RR_CLASS	Yes	R	A	84	84	1
Blank fill	Fill 3	Yes			85	89	5

ReqID-13806   TIGER data ingest SHALL accept **RT-C** *Feature-type B portion* data elements, as identified in 3.1.1.9.2.3.1 through 3.1.1.9.2.3.10.

3.1.1.9.2.3.1 Rail Feature Characteristic: FROM Stack

ReqID-13808   TIGER data ingest SHALL accept the *FROM Stack* characteristic identifying overpassing/underpassing characteristics of the FROM node of a rail feature.

ReqID-13809   The *FROM Stack* characteristic SHALL indicate the level of the feature, relative to other linear features intersecting at that node.

ReqID-13810   Values of the rail feature *FROM Stack* field SHALL be the same as the values for the road feature *FROM Stack* field, as defined in 3.1.1.9.2.2.1.

3.1.1.9.2.3.2 Rail Feature Characteristic: TO Stack

ReqID-13812   TIGER data ingest SHALL accept the *TO Stack* characteristic identifying overpassing/underpassing characteristics of the FROM node of a rail feature.

ReqID-13813   The *TO Stack* characteristic SHALL indicate the level of the feature, relative to other linear features intersecting at that node.

ReqID-13814   Values of the rail feature *TO Stack* field SHALL be the same as the values for road feature *TO Stack* field, as defined in 3.1.1.9.2.2.2.

3.1.1.9.2.3.3 Rail Feature Characteristic: Special Segment Type

ReqID-13816   TIGER data ingest SHALL the *Special segment type* indicating conditions of special rail segment types.

ReqID-13817   Values of *Special segment type* SHALL be as follows:

> T = Tunnel. The rail feature is within a tunnel.

> B = Bridge. The rail feature is on a bridge.

> F = Ferry. The rail feature is a ferry crossing.

> D = Dam. The rail feature is constructed over a man-made or earthen dam.

> L = Levee. The rail feature is constructed over a levee.

> U = Unknown. The *Special segment type* is not known.

ReqID-13824   The field SHALL be blank if the rail feature is not one of the special segment types listed above.

ReqID-13825   TIGER data ingest SHALL accept a value of U as the default value for the *Special segment type* characteristic.

3.1.1.9.2.3.4 Rail Feature Characteristic: Decked

ReqID-13827   TIGER data ingest SHALL accept the *Decked* characteristic indicating the presence of a rail or subway above or below another rail feature.

ReqID-13828   Values of the *Decked* field SHALL be as follows:

> T = Decked rail features

> U = Unknown

ReqID-13831   The field SHALL be blank if the rail feature is not decked.

ReqID-13832   TIGER data ingest SHALL accept a value of U as the default value for the *Decked* characteristic.

3.1.1.9.2.3.5 Rail Feature Characteristic: Gauge

ReqID-13834 TIGER data ingest SHALL accept the *Gauge* characteristic indicating the distance between rails of the track.

ReqID-13835 Values of the *Gauge* field SHALL be as follows:

> N = Narrow
>
> S = Standard
>
> B = Broad
>
> U = Unknown

ReqID-13840 TIGER data ingest SHALL accept a value of U as the default value for the *Gauge* characteristic.

3.1.1.9.2.3.6 Rail Feature Characteristic: Special Feature Class

ReqID-13842 TIGER data ingest SHALL accept the *Special feature class* characteristic indicating a rail segment having a special use class characteristic.

ReqID-13843 Values of the *Special feature class* field SHALL be as follows:

> C = Cog Rail Line
>
> I = Incline Rail Line
>
> L = Logging Tram
>
> S = Ski Lift
>
> T = Tram
>
> U = Unknown

ReqID-13850 The field SHALL be blank if the rail feature is not one of the special feature class types listed above.

ReqID-13851 TIGER data ingest SHALL accept a value of U as the default value for the *Special feature class* characteristic.

3.1.1.9.2.3.7 Rail Feature Characteristic: Condition of Railroad Grade

ReqID-13853 TIGER data ingest SHALL accept the *Condition of railroad grade* characteristic indicating an abandoned track grade, and the condition of the abandoned grade.

ReqID-13854 Values of the *Condition of railroad grade* field SHALL be as follows:

> T = Abandoned, track remains
>
> R = Abandoned, track has been removed
>
> U = Unknown

ReqID-13858 The field SHALL be blank if the rail feature has not been abandoned.

ReqID-13859 TIGER data ingest SHALL accept a value of U as the default value for the *Condition of railroad grade* characteristic.

3.1.1.9.2.3.8 Rail Feature Characteristic: Mass Transit Rail

ReqID-13861 TIGER data ingest SHALL accept the *Mass transit rail* characteristic indicating a mass transit rail segment, when the rail segment is not part of a road right-of-way.

ReqID-13862   Values of the *Mass transit rail* field SHALL be as follows:

        C = Carline

        S = Streetcar Track

        T = Trolleys

        M = Monorail

        O = Other Mass Transit Rail System

        U = Unknown

ReqID-13869   The field SHALL be blank if the rail feature is not a mass transit rail.

ReqID-13870   TIGER data ingest SHALL accept a value of U as the default value for the *Mass transit rail* characteristic.

3.1.1.9.2.3.9 Rail Feature Characteristic: Track Function

ReqID-13872   TIGER data ingest SHALL accept the *Track function* characteristic indicating the use of the rail segment.

ReqID-13873   Values of the *Track function* field SHALL be as follows:

        M = Main

        S = Spur

        Y = Yard

        U = Unknown

ReqID-13878   TIGER data ingest SHALL accept a value of U as the default value for the *Track function* characteristic.

3.1.1.9.2.3.10 Rail Feature Characteristic: Blank fill

ReqID-13880   TIGER data ingest SHALL accept blank fill in portions of the *Feature-type B portion* of the **RT-C** record, as identified in Table 3.1.1.9-3.

3.1.1.9.2.4 Format and Data Element Description of Feature Type C Portion

Fields within the *Feature-type C portion* of the **RT-C** record are applicable to miscellaneous transportation features, as identified in the *Feature-type code* field of the *Common portion* of the **RT-C** record. The *Feature-type C portion* will be in the same record as the *Common portion*, positioned immediately following the *Common portion*.

ReqID-13883   When the *Feature type code* in the *Common portion* of **RT-C** has a value of "C", TIGER data ingest SHALL accept the *Feature-type specific portion* of the **RT-C** as the *Feature-type C portion*, identifying fields associated with miscellaneous transportation features.

ReqID-13885   TIGER data ingest SHALL accept the **RT-C** *Feature-type C portion* record layout identified in Table 3.1.1.9-4.

Table 3.1.1.9-4 Record Layout for Record Type C - Feature-type C Portion

Description	Field	BV	Fmt	Type	Beg	End	Len
FROM Stack	FR_STACK	Yes	R	N	57	60	4
TO Stack	TO_STACK	Yes	R	N	61	64	4
Blank fill	Fill 1	Yes			65	83	19
Special feature class	MT_CLASS	Yes	R	A	84	84	1
Blank fill	Fill 2	Yes			85	89	5

ReqID-13887   TIGER data ingest SHALL accept **RT-C** *Feature-type C portion* data elements, as identified in 3.1.1.9.2.4.1 through 3.1.1.9.2.4.4.

3.1.1.9.2.4.1 Miscellaneous Transportation Feature Characteristic: FROM Stack

ReqID-13889   TIGER data ingest SHALL accept the **FROM Stack** characteristic identifying overpassing/underpassing characteristics of the FROM node of a miscellaneous transportation feature.

ReqID-13890   The **FROM Stack** characteristic SHALL indicate the level of the feature, relative to other linear features intersecting at that node.

ReqID-13891   Values of the miscellaneous transportation feature **FROM Stack** field SHALL be the same as the values for the road feature **FROM Stack** field, as defined in 3.1.1.9.2.2.1.

3.1.1.9.2.4.2 Miscellaneous Transportation Feature Characteristic: TO Stack

ReqID-13893   TIGER data ingest SHALL accept the **TO Stack** characteristic identifying overpassing/underpassing characteristics of the TO node of a miscellaneous transportation feature.

ReqID-13894   The **TO Stack** characteristic SHALL indicate the level of the feature, relative to other linear features intersecting at that node.

ReqID-13895   Values of the miscellaneous transportation feature **TO Stack** field SHALL be the same as the values for the road feature **TO Stack** field, as defined in 3.1.1.9.2.2.2.

3.1.1.9.2.4.3 Miscellaneous Transportation Feature Characteristic: Special Feature Class

ReqID-13897   TIGER data ingest SHALL the **Special feature class** characteristic indicating the type of miscellaneous transportation feature.

ReqID-13898   Values of **Special feature class** SHALL be as follows:

> I = Pipeline
>
> L = Powerline
>
> R = Runway or taxiway
>
> C = Conveyor

ReqID-13903   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.4.4 Miscellaneous Transportation Feature Characteristic: Blank fill

ReqID-13905   TIGER data ingest SHALL accept blank fill in portions of the *Feature-type C portion* of the **RT-C** record, as identified in Table 3.1.1.9-4.

3.1.1.9.2.5 Format and Data Element Description of Feature Type E Portion

Fields within the *Feature-type E portion* of the **RT-C** record are applicable to physical features, as identified in the **Feature-type code** field of the *Common portion* of the **RT-C** record. The *Feature-type E portion* will be in the same record as the *Common portion*, positioned immediately following the *Common portion*.

ReqID-13908   When the **Feature type code** in the *Common portion* of **RT-C** has a value of "E", TIGER data ingest SHALL accept the *Feature-type specific portion* of the **RT-C** as the *Feature-type E portion*, identifying fields associated with physical features.

ReqID-13910   TIGER data ingest SHALL accept the **RT-C** *Feature-type E portion* record layout identified in Table 3.1.1.9-5.

Table 3.1.1.9-5 Record Layout for Record Type C - Feature-type E Portion

Description	Field	BV	Fmt	Type	Beg	End	Len
Blank fill	Fill 1	Yes			57	83	27
Special Feature Class	PH_CLASS	Yes	R	A	84	84	1
Blank fill	Fill 2	Yes			85	89	5

ReqID-13912   TIGER data ingest SHALL accept **RT-C** *Feature-type E portion* data elements, as identified in 3.1.1.9.2.5.1 through 3.1.1.9.2.5.2.

3.1.1.9.2.5.1 Physical Feature Characteristic: Physical Feature Type

ReqID-13914   TIGER data ingest SHALL accept the **Physical feature type** characteristic indicating the type of physical feature.

ReqID-13915   Values of **Special feature class** SHALL be as follows:

>   D = Dam
>
>   L = Levee
>
>   R = Ridgeline
>
>   F = Fenceline
>
>   S = Edge of Swamp
>
>   O = Other

ReqID-13921   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.5.2 Physical Feature Characteristic: Blank fill

ReqID-13923   TIGER data ingest SHALL accept blank fill in portions of the *Feature-type E portion* of the **RT-C** record, as identified in Table 3.1.1.9-5.

3.1.1.9.2.6 Format and Data Element Description of Feature Type F Portion

Fields within the *Feature-type F portion* of the **RT-C** record are applicable to non-visible features, as identified in the **Feature-type code** field of the *Common portion* of the **RT-C** record. The *Feature-type F portion* will be in the same record as the *Common portion*, positioned immediately following the *Common portion*.

ReqID-13926   When the **Feature type code** in the *Common portion* of **RT-C** has a value of "F", TIGER data ingest SHALL accept the *Feature-type specific portion* of the **RT-C** as the *Feature-type E portion*, identifying fields associated with non-visible features.

ReqID-13928   TIGER data ingest SHALL accept the **RT-C** *Feature-type F portion* record layout
                identified in Table 3.1.1.9-6.

Table 3.1.1.9-6 Record Layout for Record Type C - Feature-type F Portion

Description	Field	BV	Fmt	Type	Beg	End	Len
Blank fill	Fill 1	Yes			57	82	26
Cadastral boundary type	NV_CBTYP	Yes			83	83	1
Special feature class	NV_CLASS	Yes	R	A	84	84	1
Blank fill	Fill 2	Yes			85	89	5

ReqID-13930   TIGER data ingest SHALL accept **RT-C** *Feature-type F portion* data elements, as
                identified in 3.1.1.9.2.6.1 through 3.1.1.9.2.6.4.

3.1.1.9.2.6.1 Non-Visible Feature Characteristic: Cadastral Boundary Type

ReqID-13932   TIGER data ingest SHALL the ***Cadastral boundary type*** characteristic, indicating a
                presence and type of cadastral non-visible feature.

ReqID-13933   Values of the ***Cadastral boundary type*** field SHALL be as follows:

> P = Cadastral Boundary, Parcel line type
>
> V = Cadastral Boundary, Public Land Survey System line type
>
> R = Cadastral Boundary, Other real property line type
>
> U = Unknown

ReqID-13937   The field SHALL be blank if the feature is not a cadastral boundary.

ReqID-13938   TIGER data ingest SHALL accept a value of U as the default value for this characteristic.

3.1.1.9.2.6.2 Non-Visible Feature Characteristic: Special Feature Class

ReqID-13940   TIGER data ingest SHALL the ***Special feature class*** characteristic, indicating a presence
                and type of a special non-visible feature.

ReqID-13941   Values of the ***Special feature class*** field SHALL be as follows:

> O = Offset Boundary of a Legal Entity
>
> S = Non-visible Separation Line used with offset and corridor boundaries

ReqID-13945   The field SHALL be blank if the feature is not a ***Special feature class*** feature.

ReqID-13946   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.6.3 Non-Visible Feature Characteristic: Blank fill

ReqID-13948   TIGER data ingest SHALL accept blank fill in portions of the *Feature-type F portion* of
                the **RT-C** record, as identified in Table 3.1.1.9-6.

3.1.1.9.2.7 Format and Data Element Description of Feature Type H Portion

Fields within the *Feature-type H portion* of the **RT-C** record are applicable to linear hydrographic
features, as identified in the ***Feature-type code*** field of the *Common portion* of the **RT-C** record. The
Feature-type H portion will be in the same record as the *Common portion*, positioned immediately
following the *Common portion*.

ReqID-13951   When the **Feature type code** in the *Common portion* of **RT-C** has a value of "H", TIGER data ingest SHALL accept the *Feature-type specific portion* of the **RT-C** as the *Feature-type H portion*, identifying fields associated with linear hydrographic features.

ReqID-13953   TIGER data ingest SHALL accept the **RT-C** *Feature-type H portion* record layout identified in Table 3.1.1.9-7.

Table 3.1.1.9-7 Record Layout for Record Type C - Feature-type H Portion

Description	Field	BV	Fmt	Type	Beg	End	Len
FROM Stack	FR_STACK	Yes	R	N	57	60	4
TO Stack	TO_STACK	Yes	R	N	61	64	4
Blank fill	Fill 1	Yes			65	69	5
Hydro feature width	WIDTH	Yes	R	N	70	74	5
Blank fill	Fill 2	Yes			75	75	1
Hydro flow direction	HY_FLOW	Yes	R	A	76	76	1
Internal water line	HY_INT	Yes	R	A	77	77	1
Shoreline	HY_SHORE	Yes	R	A	78	78	1
USGS closure line flag	HY_CLFLG	Yes	R	A	79	79	1
Hydrographic category	HY_CAT	Yes	R	A	80	80	1
Blank fill	Fill 3	Yes			81	83	3
Special feature class	HY_CLASS	Yes	R	A	84	84	1
Blank fill	Fill 4	Yes			85	89	5

ReqID-13955   TIGER data ingest SHALL accept **RT-C** *Feature-type H portion* data elements, as identified in 3.1.1.9.2.7.1 through 3.1.1.9.2.7.10.

3.1.1.9.2.7.1 Linear Hydro Feature Characteristic: FROM Stack

ReqID-13957   TIGER data ingest SHALL accept the **FROM Stack** characteristic identifying overpassing/underpassing characteristics of the FROM node of a linear hydro feature.

ReqID-13958   The **FROM Stack** characteristic SHALL indicate the level of the feature, relative to other linear features intersecting at that node.

ReqID-13959   Values of the linear hydro feature **FROM Stack** field SHALL be the same as the values for the road feature **FROM Stack** field, as defined in 3.1.1.9.2.2.1.

3.1.1.9.2.7.2 Linear Hydro Feature Characteristic: TO Stack

ReqID-13961   TIGER data ingest SHALL accept the **TO Stack** characteristic identifying overpassing/underpassing characteristics of the TO node of a linear hydro feature.

ReqID-13962   The **TO Stack** characteristic SHALL indicate the level of the feature, relative to other linear features intersecting at that node.

ReqID-13963   Values of the linear hydro feature **TO Stack** field SHALL be the same as the values for the road feature **TO Stack** field, as defined in 3.1.1.9.2.2.2.

3.1.1.9.2.7.3 Linear Hydro Feature Characteristic: Hydro Feature Width

ReqID-13965   TIGER data ingest SHALL the **Hydro feature width** characteristic indicating the side-to-side width of the linear hydro feature.

ReqID-13966   The value of the **Hydro feature width** field SHALL be in meters.

ReqID-13967   A value of 0 (zero) SHALL indicate that the **Hydro feature width** is unknown.

ReqID-13968   TIGER data ingest SHALL accept a value of 0 (zero) as the default value for the **Hydro feature width** characteristic.

3.1.1.9.2.7.4 Linear Hydro Feature Characteristic: Hydro Flow Direction

ReqID-13970   TIGER data ingest SHALL accept the **Hydro flow d*irection*** characteristic indicating the direction of water flow on the linear hydro feature.

ReqID-13971   Values of the **Hydro flow direction** field SHALL be as follows:

> F = From the FROM node to the TO node
>
> T = From the TO node to the FROM node
>
> B = Bi-directional flow
>
> I = Indiscernible
>
> N = No flow
>
> U = Unknown

ReqID-13978   TIGER data ingest SHALL accept a value of U as the default value for the **Flow direction** characteristic.

3.1.1.9.2.7.5 Linear Hydro Feature Characteristic: Internal Water Line

ReqID-13980   TIGER data ingest SHALL accept the **Internal water line** characteristic indicating the nature of an internal line (usually the centerline) in a double-line portrayed water feature.

ReqID-13981   Values of the **Internal water line** field SHALL be as follows:

> C = Area Naming Boundary
>
> N = NHD artificial path or connector
>
> A = Area Measurement Boundary

ReqID-13985   The field SHALL be blank if the hydro feature is not an internal water line.

ReqID-13986   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.7.6 Linear Hydro Feature Characteristic: Special Feature Class

ReqID-13988   TIGER data ingest SHALL accept the **Special feature class** characteristic indicating a specially defined water segment type.

ReqID-13989   Values of the **Special feature class** field SHALL be as follows:

> A = Aqueduct
>
> B = Braided
>
> C = Canal/Ditch
>
> F = Fish Ladder
>
> L = Spillway
>
> M = Flume
>
> N = Connector
>
> R = River, Stream
>
> S = Siphon

3 = 3-mile Limit

U = Unknown

ReqID-14001   The field SHALL be blank if the hydro feature is not one of the special feature class types listed above.

ReqID-14002   TIGER data ingest SHALL accept a value of U as the default value for the **Special feature class** characteristic.

3.1.1.9.2.7.7 Linear Hydro Feature Characteristic: Shoreline

ReqID-14004   TIGER data ingest SHALL accept the **Shoreline** characteristic indicating that the linear hydro feature is the edge of double line water.

ReqID-14005   Values of the **Shoreline** field SHALL be as follows:

5 = Mean Low Low

4 = Mean Low

3 = Mean

2 = Mean High

1 = Mean High High

0 = Unknown

Blank Character (ASCII 32) =Not Applicable (feature is not a shoreline)

A Blank character is the default value for the **Shoreline** characteristic.

3.1.1.9.2.7.8 Linear Hydro Feature Characteristic: USGS Closure Line Flag

ReqID-14014   TIGER data ingest SHALL accept the **USGS Closure line flag** characteristic indicating that the linear hydro feature is a USGS closure line.

ReqID-14015   Values of the **USGS Closure line flag** field SHALL be as follows:

Y = Yes; the linear hydro feature is a USGS closure line

N = No; the linear hydro feature is not a USGS closure line

ReqID-14018   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.7.9 Linear Hydro Feature Characteristic: Hydrographic Category

ReqID-14020   TIGER data ingest SHALL accept the **Hydrographic category** characteristic indicating the stability of a linear hydro feature.

ReqID-14021   Values of the **Hydrographic category** field SHALL be as follows:

P = Perennial

I = Intermittent

U = Unknown

ReqID-14025   TIGER data ingest SHALL accept a value of U as the default value for the **Hydrographic category** characteristic.

3.1.1.9.2.7.10 Linear Hydro Feature Characteristic: Blank fill

ReqID-14027   TIGER data ingest SHALL accept blank fill in portions of the *Feature-type H portion* of the **RT-C** record, as identified in Table 3.1.1.9-7.

3.1.1.9.2.8 Format and Data Element Description of Feature Type 0 (Zero) Portion

Fields within the *Feature-type 0 (Zero) portion* of the **RT-C** record are applicable to point landmark features (including point hydro features), as identified in the **Feature-type code** field of the *Common portion* of the **RT-C** record. The *Feature-type 0 portion* will be in the same record as the *Common portion*, positioned immediately following the *Common portion*.

ReqID-14030   When the **Feature type code** in the *Common portion* of **RT-C** has a value of "0", TIGER data ingest SHALL accept the *Feature-type specific portion* of the **RT-C** as the *Feature-type 0 portion*, identifying fields associated with point landmark features, including point hydro features.

ReqID-14032   TIGER data ingest SHALL accept the **RT-C** *Feature-type 0 portion* record layout identified in Table 3.1.1.9-8.

Table 3.1.1.9-8 Record Layout for Record Type C - Feature-type 0 (Zero) Portion

Description	Field	BV	Fmt	Type	Beg	End	Len
Blank fill	Fill 1	Yes			57	76	20
Area hydro feature class	H2_CLASS	Yes	R	A	77	77	1
City hall feature class	CITYHALL	Yes	R	A	78	78	1
Police station feature class	POLICE	Yes	R	A	79	79	1
Fire department feature class	FIRE	Yes	R	A	80	80	1
Library feature class	LIBRARY	Yes	R	A	81	81	1
Transportation feature class	TRANS	Yes	R	A	82	82	1
Government or institution feature class	INST	Yes	R	A	83	83	1
Blank fill	Fill 2	Yes			84	84	1
Commercial or other feature class	COMM	Yes	R	A	85	85	1
Blank fill	Fill 3	Yes			86	89	4

ReqID-14034   TIGER data ingest SHALL accept **RT-C** *Feature-type E portion* data elements, as identified in 3.1.1.9.2.8.1 through 3.1.1.9.2.8.9.

3.1.1.9.2.8.1 Point Landmark Feature Characteristic: Point Hydro Feature Class

ReqID-14036   TIGER data ingest SHALL accept the **Point hydro feature class** characteristic indicating that the landmark feature is a hydro feature.

ReqID-14037   Values of **Point hydro feature class** SHALL be as follows:

> F = Fountain
>
> G = Geyser
>
> L = Waterfall
>
> M = Mud pot
>
> S = Spring
>
> W = Well

ReqID-14044   The field SHALL be blank if the point landmark feature is not a hydro feature.

ReqID-14045   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.8.2 Point Landmark Feature Characteristic: City Hall Feature Class

ReqID-14047   TIGER data ingest SHALL accept the *City hall feature class* characteristic indicating that the landmark feature includes a city hall or city hall class feature.

ReqID-14048   Values of the *City hall feature class* field SHALL be as follows:

> Y = Yes; the landmark feature includes a city hall class feature (e.g., town hall, courthouse, county hall)

> N = No; the landmark feature does not include a city hall class feature

ReqID-14051   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.8.3 Point Landmark Feature Characteristic: Police Station Feature Class

ReqID-14053   TIGER data ingest SHALL accept the *Police station feature class* characteristic indicating that the landmark feature includes a police station.

ReqID-14054   Values of the *Police Station feature class* field SHALL be as follows:

> Y = Yes; the landmark feature includes a police station

> N = No; the landmark feature does not include a police station

ReqID-14057   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.8.4 Point Landmark Feature Characteristic: Fire Department Feature Class

ReqID-14059   TIGER data ingest SHALL accept the *Fire department feature class* characteristic indicating that the landmark includes a fire department.

ReqID-14060   Values of *Fire department feature class* SHALL be as follows:

> Y = Yes; the landmark feature includes a fire department

> N = No; the landmark feature does not include a fire department

ReqID-14063   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.8.5 Point Landmark Feature Characteristic: Library Feature Class

ReqID-14065   TIGER data ingest SHALL accept the *Library feature class* characteristic indicating that the landmark includes a library.

ReqID-14066   Values of *Library feature class* SHALL be as follows:

> Y = Yes; the landmark feature includes a library

> N = No; the landmark feature does not include a library

ReqID-14069   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.8.6 Point Landmark Feature Characteristic: Transportation Feature Class

ReqID-14071   TIGER data ingest SHALL accept the *Transportation feature class* characteristic indicating that the landmark feature is a transportation feature.

ReqID-14072   Values of *Transportation feature class* SHALL be as follows:

> A = Airport structure

> B = Bus terminal

H = Helicopter landing pad

M = Marine terminal

P = Seaplane anchorage

S = Subway station

T = Train station

U = Undefined or mixed transportation terminal

ReqID-14081   The field SHALL be blank if the point landmark feature is not one of the transportation feature class types listed above.

ReqID-14082   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.8.7 Point Landmark Feature Characteristic: Government/Institutional Feature Class

ReqID-14084   TIGER data ingest SHALL accept the *Government/institutional feature class* characteristic indicating that the landmark feature is a government or institutional feature.

ReqID-14085   Values of Government/institutional feature class SHALL be as follows:

A = National Park Service Area

B = Halfway house

C = Convent or monastery

E = Educational institutional

F = National forest or other federal land

G = Government center

H = Hospital

I = County home

J = Custodial facility, jail, detention center, federal penitentiary, state prison, or prison farm

L = Shelter or mission

M = Military installation

N = Nursing home, retirement home, or home for the aged

O = Orphanage

P = Post office

R = Religious institution

S = State or local park or forest

U = Urbanización: identifiable community developments in Puerto Rico

Y = Cemetery

ReqID-14104   The field SHALL be blank if the point landmark feature is not one of the government or institutional feature class types listed above.

ReqID-14105   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.8.8 Point Landmark Feature Characteristic: Commercial/Other Feature Class

ReqID-14107 TIGER data ingest SHALL accept the ***Commercial/other feature class*** characteristic indicating that the landmark feature is a commercial or other feature.

ReqID-14108 Values of ***Commercial/other feature class*** SHALL be as follows:

> A = Amusement center
>
> C = Campground
>
> E = Employment center
>
> G = Golf course
>
> H = Hotel, motel, resort, spa, YMCA, or YWCA
>
> I = Industrial building or industrial park
>
> L = Lookout tower, designed for occupancy/staffing (e.g., fire tower)
>
> M = Marina
>
> N = Named island
>
> O = Office building or office park
>
> P = Mountain peak or other topologic feature
>
> S = Shopping center or major retail center
>
> T = Tower/beacon, designed to be non-occupied/staffed (e.g., radio tower)

ReqID-14122 The field SHALL be blank if the point landmark feature is not one of the commercial or other feature class types listed above.

ReqID-14123 TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.8.9 Point Landmark Feature Characteristic: Blank fill

ReqID-14125 TIGER data ingest SHALL accept blank fill in portions of the *Feature-type 0 portion* of the **RT-C** record, as identified in Table 3.1.1.9-8.

3.1.1.9.2.9 Format and Data Element Description of Feature Type 2 Portion

Fields within the *Feature-type 2 portion* of the **RT-C** record are applicable to area landmark features (including area hydro features), as identified in the ***Feature-type code*** field of the *Common portion* of the **RT-C** record. The *Feature-type 2 portion* will be in the same record as the *Common portion*, positioned immediately following the *Common portion*.

ReqID-14128 When the ***Feature type code*** in the *Common portion* of **RT-C** has a value of "2", TIGER data ingest SHALL accept the *Feature-type specific portion* of the **RT-C** as the *Feature-type 2 portion*, identifying fields associated with area landmark features, including area hydro features.

ReqID-14130 TIGER data ingest SHALL accept the **RT-C** *Feature-type 2 portion* record layout identified in Table 3.1.1.9-9.

Table 3.1.1.9-9 Record Layout for Record Type C - Feature-type 2 Portion

Description	Field	BV	Fmt	Type	Beg	End	Len
Blank fill	Fill 1	Yes			57	76	20
Area hydro feature class	H2_CLASS	Yes	R	A	77	77	1
City hall feature class	CITYHALL	Yes	R	A	78	78	1
Police station feature class	POLICE	Yes	R	A	79	79	1
Fire department feature class	FIRE	Yes	R	A	80	80	1
Library feature class	LIBRARY	Yes	R	A	81	81	1
Transportation feature class	TRANS	Yes	R	A	82	82	1
Government or institution feature class	INST	Yes	R	A	83	83	1
Blank fill	Fill 2	Yes			84	84	1
Commercial or other feature class	COMM	Yes	R	A	85	85	1
Blank fill	Fill 3	Yes			86	89	4

ReqID-14132   TIGER data ingest SHALL accept **RT-C** *Feature-type 2 portion* data elements, as identified in 3.1.1.9.2.9.1 through 3.1.1.9.2.9.9.

3.1.1.9.2.9.1 Area Landmark Feature Characteristic: Area hydro Feature Class

ReqID-14134   TIGER data ingest SHALL accept the *Area hydro feature class* characteristic indicating that the landmark feature is a hydro feature.

ReqID-14135   Values of *Area hydro feature class* SHALL be as follows:

> B = Bay
>
> E = Estuary
>
> G = Glacier/Ice mass
>
> L = Lake/Pond
>
> M = Marsh/Swamp
>
> O = Ocean
>
> P = Gravel pit – filled with water
>
> R = Reservoir
>
> S = Stream/River

ReqID-14145   The field SHALL be blank if the area landmark feature is not a hydro feature.

ReqID-14146   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.9.2 Area Landmark Feature Characteristic: City Hall Feature Class

ReqID-14148   TIGER data ingest SHALL accept the *City hall feature class* characteristic indicating that the landmark feature includes a city hall or city hall class feature.

ReqID-14149   Values of the *City hall feature class* field SHALL be as follows:

> Y = Yes; the landmark feature includes a city hall class feature (e.g., town hall, courthouse, county hall)
>
> N = No; the landmark feature does not include a city hall class feature

ReqID-14152   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.9.3 Area Landmark Feature Characteristic: Police Station Feature Class

ReqID-14154   TIGER data ingest SHALL accept the *Police station feature class* characteristic indicating that the landmark feature includes a police station.

ReqID-14155   Values of the *Police Station feature class* field SHALL be as follows:

        Y = Yes; the landmark feature includes a police station

        N = No; the landmark feature does not include a police station

ReqID-14158   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.9.4 Area Landmark Feature Characteristic: Fire Department Feature Class

ReqID-14160   TIGER data ingest SHALL accept the *Fire department feature class* characteristic indicating that the landmark includes a fire department.

ReqID-14161   Values of *Fire department feature class* SHALL be as follows:

        Y = Yes; the landmark feature includes a fire department

        N = No; the landmark feature does not include a fire department

ReqID-14164   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.9.5 Area Landmark Feature Characteristic: Library Feature Class

ReqID-14166   TIGER data ingest SHALL accept the *Library feature class* characteristic indicating that the landmark includes a library.

ReqID-14167   Values of *Library feature class* SHALL be as follows:

        Y = Yes; the landmark feature includes a library

        N = No; the landmark feature does not include a library

ReqID-14170   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.9.6 Area Landmark Feature Characteristic: Transportation Feature Class

ReqID-14172   TIGER data ingest SHALL accept the *Transportation feature class* characteristic indicating that the landmark feature is a transportation feature.

ReqID-14173   Values of *Transportation feature class* SHALL be as follows:

        A = Airport structure

        B = Bus terminal

        H = Helicopter landing pad

        M = Marine terminal

        P = Seaplane anchorage

        S = Subway station

        T = Train station

        U = Undefined or mixed transportation terminal

ReqID-14182   The field SHALL be blank if the point landmark feature is not one of the transportation feature class types listed above.

ReqID-14183   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.9.7 Area Landmark Feature Characteristic: Government/Institutional Feature Class

ReqID-14185   TIGER data ingest SHALL accept the ***Government/institutional feature class*** characteristic indicating that the landmark feature is a government or institutional feature.

ReqID-14186   Values of Government/institutional feature class SHALL be as follows:

> A = National Park Service Area
>
> B = Halfway house
>
> C = Convent or monastery
>
> E = Educational institutional
>
> F = National forest or other federal land
>
> G = Government center
>
> H = Hospital
>
> I = County home
>
> J = Custodial facility, jail, detention center, federal penitentiary, state prison, or prison farm
>
> L = Shelter or mission
>
> M = Military installation
>
> N = Nursing home, retirement home, or home for the aged
>
> O = Orphanage
>
> P = Post office
>
> R = Religious institution
>
> S = State or local park or forest
>
> U = Urbanización: identifiable community developments in Puerto Rico
>
> Y = Cemetery

ReqID-14205   The field SHALL be blank if the point landmark feature is not one of the government or institutional feature class types listed above.

ReqID-14206   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.9.8 Area Landmark Feature Characteristic: Commercial/Other Feature Class

ReqID-14208   TIGER data ingest SHALL accept the ***Commercial/other feature class*** characteristic indicating that the landmark feature is a commercial or other feature.

ReqID-14209   Values of ***Commercial/other feature class*** SHALL be as follows:

> A = Amusement center
>
> C = Campground
>
> E = Employment center
>
> G = Golf course
>
> H = Hotel, motel, resort, spa, YMCA, or YWCA
>
> I = Industrial building or industrial park

L = Lookout tower, designed for occupancy/staffing (e.g., fire tower)

M = Marina

N = Named island

O = Office building or office park

P = Mountain peak or other topologic feature

S = Shopping center or major retail center

T = Tower/beacon, designed to be non-occupied/staffed (e.g., radio tower)

ReqID-14223   The field SHALL be blank if the area landmark feature is not one of the commercial or other feature class types listed above.

ReqID-14224   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.9.9 Area Landmark Feature Characteristic: Blank fill

ReqID-14226   TIGER data ingest SHALL accept blank fill in portions of the *Feature-type 2 portion* of the **RT-C** record, as identified in Table 3.1.1.9-9.

3.1.1.9.2.10 Format and Data Element Description of Feature Type W Portion

Fields within the *Feature-type W portion* of the **RT-C** record are applicable to pedestrian walkway features, as identified in the *Feature-type code* field of the *Common portion* of the **RT-C** record. The *Feature-type W portion* will be in the same record as the *Common portion*, positioned immediately following the *Common portion*.

ReqID-14229   When the **Feature type code** in the *Common portion* of **RT-C** has a value of "W", TIGER data ingest SHALL accept the *Feature-type specific portion* of the **RT-C** as the *Feature-type W portion*, identifying fields associated with pedestrian walkway features.

ReqID-14231   TIGER data ingest SHALL accept the **RT-C** *Feature-type W portion* record layout identified in Table 3.1.1.9-10.

Table 3.1.1.9-10 Record Layout for Record Type C - Feature-type W Portion

Description	Field	BV	Fmt	Type	Beg	End	Len
FROM Stack	FR_STACK	Yes	R	N	57	60	4
TO Stack	TO_STACK	Yes	R	N	61	64	4
Median width	MEDIAN	Yes	R	N	65	69	5
Pedestrian walkway feature width	WIDTH	Yes	R	N	70	74	5
Special segment type	SPEC_SEG	Yes	R	A	75	75	1
Blank fill	Fill 1	Yes			76	83	8
Special feature class	PW_CLASS	Yes	R	A	84	84	1
Blank fill	Fill 2	Yes			85	85	5

ReqID-14233   TIGER data ingest SHALL accept **RT-C** *Feature-type W portion* data elements, as identified in 3.1.1.9.2.10.1 through 3.1.1.9.2.10.7.

3.1.1.9.2.10.1 Pedestrian Walkway Feature Characteristic: FROM Stack

ReqID-14235   TIGER data ingest SHALL accept the **FROM Stack** characteristic identifying overpassing/underpassing characteristics of the FROM node of a pedestrian walkway feature.

ReqID-14236 The **FROM Over/under level** characteristic SHALL indicate the level of the feature, relative to other linear features intersecting at that node.

ReqID-14237 Values of the pedestrian walkway feature **FROM Stack** field SHALL be the same as the values for the road feature **FROM Stack** field, as defined in 3.1.1.9.2.2.1.

3.1.1.9.2.10.2 Pedestrian Walkway Feature Characteristic: TO Stack

ReqID-14239 TIGER data ingest SHALL accept the **TO Stack** characteristic identifying overpassing/underpassing characteristics of the TO node of a pedestrian walkway feature.

ReqID-14240 The **TO Over/under level** characteristic SHALL indicate the level of the feature, relative to other linear features intersecting at that node.

ReqID-14241 Values of the pedestrian walkway feature **TO Stack** field SHALL be the same as the values for the road feature **TO Stack** field, as defined in 3.1.1.9.2.2.2.

3.1.1.9.2.10.3 Pedestrian Walkway Feature Characteristic: Median Width

ReqID-14243 TIGER data ingest SHALL accept the **Median width** characteristic indicating the width of the median of a pedestrian walkway feature.

ReqID-14244 The value of the **Median width** field SHALL be in meters.

ReqID-14245 A value of −1 SHALL indicate that there is no median.

ReqID-14246 A value of 0 (zero) SHALL indicate that the **Median width** is unknown.

ReqID-14247 TIGER data ingest SHALL accept a value of 0 (zero) as the default value for the **Median width** characteristic.

3.1.1.9.2.10.4 Pedestrian Walkway Feature Characteristic: Feature Width

ReqID-14249 TIGER data ingest SHALL accept the **Feature width** characteristic indicating the side-to-side width of the pedestrian walkway feature.

ReqID-14250 The **Feature width** characteristic SHALL include all continuing portions of the walkway (not including areas of temporary widening).

ReqID-14251 The value of the **Feature width** field SHALL be in meters.

ReqID-14252 A value of 0 (zero) SHALL indicate that the **Feature width** is unknown.

ReqID-14253 TIGER data ingest SHALL accept a value of 0 (zero) as the default value for the **Feature width** characteristic.

3.1.1.9.2.10.5 Pedestrian Walkway Feature Characteristic: Special Segment Type

ReqID-14255 TIGER data ingest SHALL the **Special segment type** indicating conditions of special pedestrian walkway segment types.

ReqID-14256 Values of **Special segment type** SHALL be as follows:

B = Bridge. The pedestrian walkway feature is on a bridge.

D = Dam. The pedestrian walkway feature is constructed over a man-made or earthen dam.

L = Levee. The pedestrian walkway feature is constructed over a levee.

T = Tunnel. The pedestrian walkway feature is within a tunnel.

U = Unknown. The **Special segment type** is not known.

ReqID-14262   The field SHALL be blank if the pedestrian walkway feature is not one of the special
segment types listed above.

ReqID-14263   TIGER data ingest SHALL accept a value of U as the default value for the **Special
segment type** characteristic.

3.1.1.9.2.10.6 Pedestrian Walkway Feature Characteristic: Special Feature Class

ReqID-14265   TIGER data ingest SHALL accept the **Special feature class** characteristic indicating the
type of pedestrian walkway.

ReqID-14266   Values of **Special feature class** SHALL be as follows:

> B = Bike Path
>
> H = Bridle Path
>
> S = Stairway
>
> W = Walkway/Trail
>
> M = Mixed Use

ReqID-14272   TIGER data ingest SHALL accept no default value for this characteristic.

3.1.1.9.2.10.7 Pedestrian Walkway Feature Characteristic: Blank fill

ReqID-14274   TIGER data ingest SHALL accept blank fill in portions of the *Feature-type W portion* of
the **RT-C** record, as identified in Table 3.1.1.9-9.

3.1.1.10 Record Type R - Name and Address Relationship Record

Record Type R (**RT-R**) provides the relationship between a feature and its name(s) and address(es). The
record has a many-to-one relationship with **Record Type 1** (linking the 1-cell to one or more names
and/or addresses). The record also has a many-to-one relationship with **Record Type K** (linking the Point
Feature to one or more names and addresses), a many-to-one relationship with **Record Type L** (linking
the Area Landmark to one or more names), and a many-to-one relationship with **Record Type G** (linking
the Geographic Entity to one or more names). The record has a one-to-one relationship with **Record
Type N** (Names).

3.1.1.10.1 Purpose

ReqID-7501   TIGER data ingest SHALL accept the **RT-R** record, providing linkage between a feature
and its associated feature name and address/address range.

> A **RT-R** record identifies the link to the **RT-N** identifying the 1-cell's feature name,
> the left side address range, and the right side address range, when referenced by a
> **RT-1** *Key to name and address relationship record.*
>
> > Multiple **RT-R** records may be associated with one **RT-1**, if the 1-cell has
> > multiple feature names and/or multiple address ranges.
>
> A **RT-R** record identifies the link to the **RT-N** identifying the **RT-K** Geographic
> Entity name, when referenced by a **RT-G** *Key to name and address relationship
> record.*
>
> > Multiple **RT-R** records may be associated with one **RT-G**, if the Geographic
> > Entity has multiple names.
>
> A **RT-R** record identifies the link to the **RT-N** identifying the Point Feature name,
> when referenced by a **RT-L** *Key to name and address relationship record.*

Multiple **RT-R** records may be associated with one **RT-L**, if the Point Feature has multiple names.

A **RT-R** record identifies the link to the **RT-N** identifying the **RT-K** Area Landmark name, when referenced by a **RT-K** *Key to name and address relationship record.*

Multiple **RT-R** records may be associated with one **RT-K**, if the Area Landmark has multiple feature names and/or multiple addresses.

3.1.1.10.2 Record Format

ReqID-7481   TIGER data ingest SHALL accept the **RT-R File** consisting of multiple **RT-R** records, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-5898   TIGER data ingest SHALL accept the **RT-R** record layout defined in Table 3.1.1.10.

Table 3.1.1.10 Record Layout for Record Type R

Description	Field	BV	Fmt	Type	Beg	End	Len
Record key	NameAddressRecID	No	L	A	1	17	17
Record sequence number	NAMADDRECSEQ	No	R	N	18	21	4
Back-pointing record ID	BRID	No	R	A	22	38	17
Key to name record	REC_N_KEY	No	L	A	39	55	17
Key to left address record	LREC_A_KEY	Yes	L	A	56	72	17
Key to right address record	AREC_A_KEY	Yes	L	A	73	89	17
Key to metadata	MID	Yes	R	A	90	106	17

3.1.1.10.3 Data Element Dictionary

ReqID-11921   TIGER data ingest SHALL accept **RT-R** data elements, as identified in this section.

ReqID-12883   TIGER data ingest SHALL accept the *Record key* as the **RT-R** foreign key, defined as follows:

1 (one) character *Record type* (the value is always "R" in this record type)

10 (ten) character *Record ID* code

6 (six) character *Date* (date the file was created, YYMMDD format)

ReqID-7490   When a feature has more than one name, additional **RT-R** records SHALL be used to reference additional **RT-N** records.

ReqID-11909   Each additional **RT-R** SHALL have the same *Record key*

ReqID-11910   Each additional **RT-R** SHALL increment the *Record sequence number*.

ReqID-13398   The value of the *Record sequence number* of the first **RT-R** in a sequence SHALL be "0001".

ReqID-14295   When a feature has more than one address or address range associated with a given name, a single **RT-R** record SHALL be used to reference left-side and right-side **RT-A** records. (The **RT-A** records would sequence for multiple addresses or address ranges, as defined in 3.1.1.1.2.3.)

ReqID-2855   TIGER data ingest SHALL accept the *Back pointing record ID* as the foreign key of the referencing **RT-1**, **RT-G**, **RT-K**, or **RT-L**.

ReqID-7486   TIGER data ingest SHALL accept the *Key to name record* as the foreign key of the **RT-N** identifying the feature name.

ReqID-2758   TIGER data ingest SHALL accept the ***Key to left address record*** as the foreign key of the **RT-A** identifying a feature's left side address range.

ReqID-7485   TIGER data ingest SHALL accept the ***Key to right address record*** as the foreign key of the **RT-A** identifying a feature's right side address range.

ReqID-7484   TIGER data ingest SHALL accept the ***Key to metadata record*** as the foreign key of the **RT-M** Metadata record identifying the means code.

3.1.1.11 Record Type N - Name Record

Record Type N (**RT-N**) identifies names associated with features, area landmarks, or point landmarks. Each record contains one name. Additional names are associated with a single feature when multiple **RT-R** records or multiple **RT-A** records refer to additional **RT-N**'s with other names.

3.1.1.11.1 Purpose

ReqID-7478   TIGER data ingest SHALL accept an **RT-N** record, identifying the name of a feature in the TIGER files.

A **RT-N** record identifies the name of the feature associated with the **RT-R** record, further referenced by a **RT-1**, **RT-G**, **RT-K**, or **RT-L** ***Key to name and address relationship record***.

If a feature has more than one name, multiple **RT-R**'s are used to reference multiple **RT-N**'s.

3.1.1.11.2 Record Format

ReqID-7467   TIGER data ingest SHALL accept the **RT-N File** consisting of multiple **RT-N** records, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-5857   TIGER data ingest SHALL accept the **RT-N** record defined in Table 3.1.1.11.

Table 3.1.1.11 Record Layout for Record Type N

Description	Field	BV	Fmt	Type	Beg	End	Len
Record key	NameRecID	No	L	A	1	17	17
Feature name	FENAME	No	L	A	18	117	100

3.1.1.11.3 Data Element Dictionary

ReqID-11920   TIGER data ingest SHALL accept **RT-N** data elements, as identified below.

ReqID-12879   TIGER data ingest SHALL accept the ***Record key*** is the **RT-N** foreign key, defined as follows:

1 (one) character ***Record type*** (the value is always "N" in this record type)

10 (ten) character ***Record ID*** code

6 (six) character ***Date*** (date the file was created, YYMMDD format)

ReqID-7477   TIGER data ingest SHALL accept the ***Feature name*** field containing the feature name.

ReqID-8081   The ***Feature name*** SHALL include, if applicable, the feature direction, prefix, feature type (TIGER/Line FETYPE), prefix, display, feature direction, suffix, and feature identifier extension indicator, as contained within the TIGER database.

ReqID-2751   Full names (no abbreviations) SHALL be used in the ***Feature Name*** field.

3.1.1.12 Record Type A - Address Number Data Record

Record Type A (RT-A) provides an address for a point feature or address ranges for a chain.

3.1.1.12.1 Purpose

ReqID-7620   TIGER data ingest SHALL accept the **RT-A** record identifying addresses and address ranges.

> A **RT-A** record identifies the address range of the left side of the 1-cell, when referenced by a **RT-R** *Key to left address range record,* further referenced by a **RT-1.**

> A **RT-A** record identifies the address range of the right side of the 1-cell, when referenced by a **RT-R** *Key to right address range record,* further referenced by a **RT-1.**

> A **RT-A** record identifies the address of a point feature, when referenced by a **RT-R** *Key to left address range record,* further referenced by a **RT-L.**

ReqID-7637   TIGER data ingest SHALL accept multiple **RT-A**'s associated with one **RT-R**, if the **RT-1** 1-cell has multiple address ranges on a side.

3.1.1.12.2 Record Format

ReqID-7625   TIGER data ingest SHALL accept the **RT-A File** consisting of multiple **RT-A** records, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-6567   TIGER data ingest SHALL accept the **RT-A** record format defined in Table 3.1.1.12.

Table 3.1.1.12 Record Layout for Record Type A

Description	Field	BV	Fmt	Type	Beg	End	Len
Record key	addRecID	No	L	A	1	17	17
Record sequence number	addRecSeqNum	No	R	N	18	21	4
Start address number	FRADD	Yes	L	A	22	32	11
End address number	TOADD	Yes	L	A	33	43	11
ZIP code	ZIP	Yes	L	N	44	48	5
Imputed field	IMPUTE	No	R	A	49	49	1
Key to metadata record	MIDFROM	Yes	R	A	50	66	17
Key to metadata record	MIDTO	Yes	R	A	67	83	17

3.1.1.12.3 Data Element Dictionary

ReqID-11928   TIGER data ingest SHALL accept **RT-A** data elements, as identified in this section.

ReqID-13046   TIGER data ingest SHALL accept the ***Record key*** as the **RT-A** foreign key, defined as follows:

> 1 (one) character ***Record type*** (the value is always alphabetic "A" in this record type)

> 10 (ten) character ***Record ID*** code

> 6 (six) character ***Date*** (date the file was created, YYMMDD format)

ReqID-2893   If the 1-cell has more than one address range on the left side, then an additional **RT-A** record SHALL be used for each additional address range.

ReqID-2894   Additional **RT-A** records for the same 1-cell left side SHALL have the same ***Record key*** as the first **RT-A**.

ReqID-2895   Each additional **RT-A** record SHALL increment the ***Record sequence number***.

ReqID-13460   The value of the first ***Record sequence number*** in a **RT-A** sequence SHALL be "0001".

ReqID-13050   If the 1-cell has more than one address range on the right side, then an additional **RT-A** SHALL be used for each additional address range.

ReqID-13051   Additional **RT-A** records for the same 1-cell right side SHALL have the same ***Record key*** as the first **RT-A**.

ReqID-13052   Each additional **RT-A** record SHALL increment the ***Record sequence number***.

ReqID-13461   The value of the first ***Record sequence number*** in a **RT-A** sequence SHALL be "0001".

ReqID-7639   The ***Record key*** for a **RT-A** right side address range SHALL be different from that of the **RT-A**'s left side address range.

ReqID-2899   TIGER data ingest SHALL accept the ***Start address number*** as identifying the starting address for the applicable side of the associated 1-cell.

ReqID-13490   TIGER data ingest SHALL accept the ***Start address number*** as identifying the address for the applicable side an associated point feature.

ReqID-2900   TIGER data ingest SHALL accept the ***End address number*** as identifying the ending address for the applicable side of the associated 1-cell.

ReqID-7638   TIGER data ingest SHALL accept the ***ZIP code*** field as identifying the ZIP code for the applicable side of the associated 1-cell.

ReqID-13054   TIGER data ingest SHALL accept the ***Imputed*** field as identifying if the FROM and/or TO components of the address range are imputed (e.g., approximated when a larger segment was divided and the address range was divided with the segment).

ReqID-13055   Values for the ***Imputed*** field SHALL be as follows:

> B = Both components are imputed
>
> N = Neither component is imputed
>
> F = FROM component (only) is imputed
>
> T = TO component (only) is imputed
>
> U = Unknown

ReqID-13062   TIGER data ingest SHALL accept the ***Key to FROM metadata*** as identifying the metadata record defining the source for the **FROM** component of the address range.

ReqID-13063   TIGER data ingest SHALL accept the ***Key to TO metadata*** as identifying the metadata record defining the source for the **TO** component of the address range.

3.1.1.13 Record Type I - Non-Census IDs Record

Record Type I (**RT-I**) (alphabetic I) identifies Non-Census IDs associated with line, point, and area features and geographic entities. IDs in **RT-I** typically originated in non-Census files and databases, such as GIS files, NHD, and FHY databases. Features or entities that do not have a non-census ID will not have an associated Type I record. A single Type I record accommodates one or two non-census IDs for a specific feature. Additional records are used if a feature has more than two non-census IDs.

3.1.1.13.1 Purpose

ReqID-7511   TIGER data ingest SHALL accept an **RT-I** record, identifying the non-census IDs for a line, point, or area feature or geographic entity.

> A **RT-I** record identifies Non-Census IDs for a 1-cell line feature when referenced by a **RT-1** *Key to non-census IDs record.*

> A **RT-I** record identifies Non-Census IDs for a point feature when referenced by a **RT-L** *Key to non-census IDs record.*

> A **RT-I** record identifies Non-Census IDs for an area feature when referenced by a **RT-K** *Key to non-census IDs record.*

> A **RT-I** record identifies Non-Census IDs for a geographic entity when referenced by a **RT-G** *Key to non-census IDs record.*

ReqID-12890   TIGER data ingest SHALL accept multiple **RT-I** records associated with one **RT-1**, **RT-L**, **RT-K**, or **RT-G**, if the feature or entity has more than two non-census IDs.

3.1.1.13.2 Record Format

ReqID-7526   TIGER data ingest SHALL accept the **RT-I File** consisting of multiple (zero to n) **RT-I** records, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-5966   TIGER data ingest SHALL accept the **RT-I** record layout identified in Table 3.1.1.13.

Table 3.1.1.13 Record Layout for Record Type I

Description	Field	BV	Fmt	Type	Beg	End	Len
Record key	NCID_ ID	No	L	A	1	17	17
Record sequence number	NCIDRECSEQ	No	R	N	18	21	4
Back-pointing record ID	BRID	No	L	A	22	38	17
Non-census ID #1	NCID1	No	L	A	39	63	25
NCID #1 type	NCID1_TYPE	No	L	A	64	64	1
Blank fill	Fill 1	Yes			65	65	1
Key to NCID #1 metadata	NCID1_MID	No	L	A	66	82	17
Non-census ID #2	NCID2	Yes	L	A	83	107	25
NCID #2 type	NCID2_TYPE	Yes	L	A	108	108	1
Blank fill	Fill 2	Yes			109	109	1
Key to NCID #2 metadata	NCID2_MID	Yes	L	A	110	126	17

3.1.1.13.3 Data Element Dictionary

ReqID-11922   TIGER data ingest SHALL accept **RT-I** data elements, as identified in this section.

ReqID-12891   TIGER data ingest SHALL accept the *Record key* as the **RT-I** foreign key, defined as follows:

> 1 (one) character *Record type* (the value is always alphabetic "I" in this record type)

> 10 (ten) character *Record ID* code

> 6 (six) character *Date* (date the file was created, YYMMDD format)

ReqID-7521   When a feature has more than two *Non-Census IDs*, multiple **RT-I** records SHALL be used for additional *Non-Census IDs*.

ReqID-11907   Each additional **RT-I** record SHALL have the same *Record key*

ReqID-11908   Each additional **RT-I** record SHALL increment the ***Record sequence number***.

ReqID-13400   The value of the ***Record sequence number*** of the first **RT-I** in a sequence SHALL be "0001".

ReqID-14296   TIGER data ingest SHALL accept the ***Back-pointing record ID*** as the foreign key of the referencing **RT-1**, **RT-G**, **RT-K**, or **RT-L**.

ReqID-7530   TIGER data ingest SHALL accept the ***Non-census ID*** fields identifying alternate feature names for the feature.

ReqID-12895   TIGER data ingest SHALL accept the ***NCID type*** identifying the type of non-census ID.

ReqID-13438   Values for ***NCID type*** SHALL be as follows:

> R = The NCID is the river reach code from the NHD
>
> G = The NCID is the local ID from a GIS file
>
> F = The NCID is the FHY (U.S. Federal Highway) code

ReqID-12899   TIGER data ingest SHALL accept blank fill in portions of the RT-I record, as identified in Table 3.1.1.13.

ReqID-12905   TIGER data ingest SHALL accept the ***Key to Metadata*** identifying the metadata record defining the source for the non-census ID.

3.1.1.14 Record Type M (RT-M) - Metadata Record

MTAIP metadata records contain additional information about data in the other Southbound MTAIP records. Metadata is "data about data" that is critical in creating a TIGER database to support the geographic needs of the Census Bureau mission and provides a framework for other federal, tribal, state, and local government use.

MTAIP metadata is concerned with describing data (sources and quality values), defining processes for changing that data (rules, authorities, and tasking), and tracking changes made to the data (transactions).

3.1.1.14.1 Purpose

MTAIP metadata records can be divided into two functional classes: transaction records and header records. Transaction records are generally focused on describing the process by which changes have been made to MTAIP data. Header records are generally focused on rules, authorities, sources, qualities, and tasking. Southbound metadata consists only of header records, as there are no transactions to report.

MTAIP employs six (6) types of metadata header records: rule, authority, source, quality, tasking, and means. There is also a comment field that may be appended to one of the header records to provide additional information relevant to the record.

3.1.1.14.2 Metadata Header Record Format

Metadata header records have a variable length. Except for the first few fields, which are fixed, the length and structure of a record depends upon the information contained therein.

ReqID-9192   TIGER data ingest SHALL accept the **RT-M File** consisting of multiple **RT-M** records, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-9181   TIGER data ingest SHALL accept **RT-M** records, providing additional information associated with records within other MTAIP sub files.

ReqID-15570   TIGER data ingest SHALL accept **RT-M** records consisting of two parts: a fixed field part and a variable part.

ReqID-9193   TIGER data ingest SHALL accept **RT-M** records with a variable length.

ReqID-15571   The minimum length for a **RT-M** record SHALL be 29 characters.

ReqID-15572   The maximum length for a **RT-M** record SHALL be 2040 characters.

Each Southbound metadata header record contains six fixed length fields and one variable length field. The fixed fields are defined in 3.1.1.14.3, and are the same for all types of metadata header records. The variable field defines specific rules, authorities, sources, qualities, tasking, means, and comments associated with the southbound MTAIP data, and is defined in 3.1.1.14.4 - 3.1.1.14.10. The structure of the variable field consists of three parts: an initial tag, the metadata header record content, and an ending tag. The nature of these fields and their relationships are summarized in Table 3.1.1.14-1.

ReqID-12433   TIGER data ingest SHALL accept Southbound metadata header records containing one of the following fields: Rule, Authority, Source, Quality, Tasking, or Means.

Table 3.1.1.14-1 Header Type Record Relationship Table

Header Record Type	Rule	Authority	Source	Quality	Tasking	Means
Rule	Identifies a specific rule	Must have an authority	May be specific to one or more sources, or may not address a source at all.	May be specific to one or more quality value, or may not address a quality value at all.	May apply to one or more activities. May apply to all activities	
Authority		Identifies a specific authority				
Source			Identifies a specific source	Must have one or more quality records.		
Quality				Identifies one or more quality values associated with a source		
Tasking					Identifies a specific activity	
Means	May identify one or more rules applicable to NB data or MTAIP processing	Must identify one or more authorities for a rule. May identify authorities for a Means.	Must identify all NB data sources, as well as TIGER source.	Must identify the quality values for all sources, all applicable feature types.	Identifies the activities to which NB data apply.	Provides a means for identifying multiple, applicable header records as the means by which a data are established.
Comment	May be about anything, but does not have the force of a rule					

3.1.1.14.3 Metadata Header Record Fixed Field Format

ReqID-6837   TIGER data ingest SHALL accept the *Fixed Field* of the **Metadata Header Record** as specified in Table 3.1.1.14-2.

Table 3.1.1.14-2 Record Layout for Fixed Field of Metadata Header Record

Description	Field	BV	Fmt	Type	Beg	End	Len
Record type	RT	No	L	A	1	1	1
Record ID	RECID	No	R	N	2	11	10
Activity date	ADATE	No	R	N	12	17	6
Action code	FACTION	No	L	A	18	18	1
Condition code	FCONDITION	No	L	A	19	19	1
Activity ID	ACTIVITY	No	L	A	20	29	10

ReqID-15577   The *Record ID* for a **Means** Metadata Header Record SHALL also be known as the *Means ID.*

The *Means ID (or MID)* is the key by which other Northbound files refer to the Means (or basis) for their spatial and attribute values and characteristics.

The basis for spatial values is referred to as the *Spatial Means*, or *SMID*.

The basis for attribute values is referred to as the *Attribute Means*, or *AMID*.

ReqID-6922   TIGER data ingest SHALL accept the *Record key* as the **RT-M** foreign key, defined as the *Record type*, *Record ID*, and *Date*.

ReqID-12412   TIGER data ingest SHALL accept Fixed Field data elements as defined below.

ReqID-15583   The *Record type* SHALL identify the type of **Metadata** record, as follows:

M = The record is a Metadata Header record

ReqID-15585   The *Record ID* SHALL be a unique identifier for the record.

ReqID-15586   The *Record ID* SHALL be a ten character field, defined as follows:

ReqID-15587   The first character SHALL be as follows:

R = the record is a Rule Metadata Header Record

A = the record is an Authority Metadata Header Record

S = the record is a Source Metadata Header Record

Q = the record is a Quality Metadata Header Record

T = the record is a Tasking Metadata Header Record

0 (zero) = the record is a Means Metadata Header Record

ReqID-15594   Characters two through ten SHALL be a numeric value.

ReqID-15595   The range of the numeric value SHALL be 0 to 999,999,999.

ReqID-15596   The range 0 to 999,000,000 SHALL be reserved for use by the Census Bureau.

ReqID-15597   The range 999,000,001 to 999,999,999 SHALL be reserved for use by the contractor.

ReqID-15598   The *Activity date* SHALL be the date the file was created (YYMMDD format).

ReqID-15599   TIGER data ingest SHALL accept the *Action code* referring to the action taken on the record.

For Southbound metadata, the value of *Action code* is always "H", indicating that the Metadata record is a header record.

ReqID-15601   TIGER data ingest SHALL accept the **Condition code** field referring to the relationship between the referenced feature and the source material.

For Southbound metadata, the value of **Condition code** is always "X".

ReqID-9207   TIGER data ingest SHALL accept the **Activity ID** field identifying the organization responsible for providing the information in the record.

For Southbound metadata, the value of the **Activity ID** is always the following:

CensusGEO0, where (last two characters are the letter O, followed by the number 0)

3.1.1.14.4 Rule Metadata Header Record

The **Rule** record may be used for two functions:

First, the **Rule** record may be used to define particular rules employed by the Census Bureau in the building of the MTAIP southbound data.

Second, the **Rule** record may be used to define particular rules that the contractor must (or may) use in MTAIP processing.

The **Rule** record is conditional, meaning that the record is not required. The record is present when (and only when) the Census Bureau deems it necessary or desirable to identify a specific rule that has been applied to the southbound data, or to provide guidance to the contractor for MTAIP production.

The **Rule** record contains a reference to an authority, authority date, and the actual rule in textual form. The **Rule** record may also contain references to one or more sources, quality values, and/or activities, for which the rule has applicability.

ReqID-15612   TIGER data ingest SHALL accept Rule Metadata Header Records as defined below.

3.1.1.14.4.1 Purpose

The **Rule** record establishes special MTAIP data capture or processing guidelines defined by the Census Bureau. The **Rule** record is not always present, and, when present, may have limited applicability.

ReqID-15615   TIGER data ingest SHALL accept **Rule** records describing rules that the Census Bureau has applied within the Southbound MTAIP file.

ReqID-15907   TIGER data ingest SHALL accept **Rule** records describing rules by which the Census Bureau provides specific direction to the contractor performing MTAIP production.

3.1.1.14.4.2 Obligation

The obligation of the **Rule** record is *Conditional*. The **Rule** record is present in the Southbound metadata when the Census Bureau defines a specific rule for MTAIP processing.

ReqID-15618   TIGER data ingest SHALL accept zero or more metadata records containing a **Rule** record.

3.1.1.14.4.3 Rule Metadata Header Record Fixed Fields

The **RecordID** fixed field of the Rule Metadata Header Record (Table 3.1.1.14-2) is the **Rule ID**, and is used by other records in referencing the *Rule*.

ReqID-15621   TIGER data ingest SHALL accept Rule Metadata Header Record Fixed Fields as defined in 3.1.1.14.3.

ReqID-15622   The **RuleID** SHALL be defined as the 10 character **RecordID** in the fixed field of the Rule Metadata Header Record.

3.1.1.14.4.4 Rule Metadata Header Record Variable Field

ReqID-15624   TIGER data ingest SHALL accept the Rule Metadata Header Record Variable Field as defined below.

3.1.1.14.4.4.1 Tags

ReqID-15627   The tags for the Rule record SHALL be as follows:

Initial tag: <RUL>   Ending tag: </RUL>

3.1.1.14.4.4.2 Structure

ReqID-15630   The *Rule* field SHALL be composed of sub-fields, structured as follows:

<RUL>AuthorityID:CDATE:[SourceID:[CQVrecordID:]][TaskingID:]Rule</RUL>

> **Note:** In the example above, the brackets indicate conditional fields and serve to group the data for ease of reading. The brackets are not present in the actual data. The same applies to other definitions of sub-field structure throughout this section on southbound metadata.

> The colon (:) delimiter is required where it is shown in the structure and the construction rules.

3.1.1.14.4.4.3 Construction

ReqID-15635   A metadata record SHALL contain no more than one *Rule* field.

ReqID-15636   A *Rule* field SHALL open with an initial tag, defined per 3.1.1.14.4.4.1.

ReqID-15637   A *Rule* field SHALL contain one *AuthorityID* sub-field.

ReqID-15638   The *AuthorityID* sub-field SHALL consist of the following:

AuthorityID   (a ten digit identifier for an *Authority*, per 3.1.1.14.5)

ReqID-15640   The *AuthorityID* sub-field SHALL be followed by a colon (:) character.

ReqID-15641   A *Rule* field SHALL contain one *CDATE* sub-field.

ReqID-15642   The *CDATE* sub-field SHALL consist of the following:

CDATE   (a six character value for the date the rule was created, formatted as YYMMDD.)

ReqID-15644   The *CDATE* sub-field SHALL be followed by a colon (:) character.

If the *Rule* that is being defined by the *Rule* field pertains to sources, then the *CDATE* sub-field is followed by one or more *Source* sub-fields. There is one *Source* sub-field for every source affected by the rule (exception – if the rule pertains to all sources, a single *Source* sub-field will so state).

ReqID-15646   A *Rule* field SHALL contain one or more *Source* sub-fields if the *Rule* being defined specifically pertains to sources.

ReqID-15647   Each *Source* sub-field SHALL consist of the following:

SourceID   (a ten digit identifier for a *Source*, per 3.1.1.14.6)

Exception: When the *Rule* applies to all sources, the *SourceID* is the following text:

S=ALL

ReqID-15651   The *SourceID* sub-field SHALL be followed by a colon (:) character.

If the *Rule* that is being defined pertains to sources, and specifically applies to source quality values, then the *Source* sub-field is followed immediately by one or more *Quality* sub-fields. When the rule pertains to more than one source, with one or more quality values specific to each source, the *Quality* sub-field(s) are "nested" following their applicable *Source* sub-field.)

ReqID-15653   A *Rule* field SHALL contain one or more *Quality* sub-fields if the *Rule* being defined specifically pertains to sources and to the *Census Quality Values* of the sources.

ReqID-15654   Each *Quality* sub-field SHALL consist of the following:

QualityID   (a ten digit identifier for a *Census Quality Value*, per 3.1.1.14.7)

Exception: When the *Rule* applies to all quality values for the source, the *QualityID* is the following text:

Q=ALL

ReqID-15658   The *QualityID* sub-field SHALL be followed by a colon (:) character.

If the *Rule* that is being defined pertains to one or more activities, then the preceding sub-field will be followed by one or more *Tasking* sub-fields. The term "activity", when used in this context, defines a particular organization performing MTAIP processing, when that organization is specifically affected by the rule. Additionally, the *Tasking* sub-field may identify a specific processing thread for which the rule applies.

ReqID-15660   A *Rule* field SHALL contain one or more *Tasking* sub-fields if the *Rule* being defined specifically pertains to Census Bureau defined *Activities*.

ReqID-15661   The *Tasking* sub-field SHALL consist of the following:

TaskingID   (a ten digit identifier for an *Activity*, per 3.1.1.14.8)

Exception: When the *Rule* applies to all activities, the *TaskingID* is the following text:

T=ALL

ReqID-15665   The *TaskingID* sub-field SHALL be followed by a colon (:) character.

The *Rule* sub-field defines the actual *Rule* being established by the *Rule* field.

ReqID-15667   A *Rule* field SHALL contain one *Rule* statement.

ReqID-15668   The *Rule* statement SHALL be in free text, establishing one of the following:

A *Rule* the Census Bureau applied within the Southbound MTAIP data.

A *Rule* providing specific direction to the contractor performing MTAIP production.

ReqID-15670   A *Rule* field SHALL close with an ending tag, defined per 3.1.1.14.4.4.1.

3.1.1.14.5 Authority Metadata Header Record

The *Authority* record is used to establish an authority reference record identifying the authority by which a rule is stated or asserted. The record is also used to define the version of the specification used in a MTAIP Southbound data delivery. An example of an authority is "MTAIP Technical Requirements Specification, version 0, as modified by change requests 0001, 0002, and 0004."

One *Authority* record is required in order to define the specification version. Additional *Authority* records are conditional, meaning that the record is not required, with the exception that an *Authority* record is required when a *Rule* record is present, in order to establish an *Authority* for the *Rule*.

3.1.1.14.5.1 Purpose

The *Authority* record describes an authority by which an action is taken and defines the spec version applicable to the data.

ReqID-15677   TIGER data ingest SHALL accept *Authority* records describing an authority by which the Census Bureau has applied a rule contained with a *Rule* metadata record.

ReqID-15678   TIGER data ingest SHALL accept *Authority* records defining the version of the MTAIP specification applicable to the Southbound delivery (version number and applicable change requests).

3.1.1.14.5.2 Obligation

The Obligation for the *Authority* record is *Required*. One *Authority* record will be present in the Southbound metadata to define the specification version and all applicable change requests in the baseline used to prepare the Southbound data.

ReqID-15681   TIGER data ingest SHALL accept one or more metadata records containing an *Authority* record.

3.1.1.14.5.3 Authority Metadata Header Record Fixed Fields

The *RecordID* fixed field of the Authority Metadata Header Record (Table 3.1.1.14-2) is the *Authority ID,* and is used by other records in referencing the *Authority*.

ReqID-15684   TIGER data ingest SHALL accept Authority Metadata Header Record Fixed Fields as defined in 3.1.1.14.3.

ReqID-15685   The *AuthorityID* SHALL be defined as the 10 character *RecordID* in the fixed field of the Authority Metadata Header Record.

3.1.1.14.5.4 Authority Metadata Header Record Variable Field

ReqID-15687   TIGER data ingest SHALL accept the Authority Metadata Header Record Variable Field as defined below.

3.1.1.14.5.4.1 Tags

ReqID-15689   The tags for the *Authority* field SHALL be as follows:

         Initial tag: <AUT>   Ending tag:</AUT>

3.1.1.14.5.4.2 Structure

ReqID-15692   The *Authority* field SHALL be composed of sub-fields, structured as follows:

    <AUT>Authority/citation</AUT>

3.1.1.14.5.4.3 Construction

ReqID-15695   A metadata record SHALL contain no more than one *Authority* field.

ReqID-15696   An *Authority* field SHALL open with an initial tag, defined per 3.1.1.14.5.4.1.

ReqID-15697   An *Authority* field SHALL contain one *Authority* statement.

ReqID-15698   The *Authority* statement SHALL be in free text, establishing one of the following:

The authority by which the Census Bureau applied a rule.

The specification version applicable to the Southbound MTAIP data.

ReqID-15701   An *Authority* field SHALL close with an ending tag, defined per 3.1.1.14.5.4.1.

3.1.1.14.6 Source Metadata Header Record

The *Source* record is used to uniquely identify a source from which information may be extracted or to identify the TIGER file being processed. An example of a source is "Richmond County, Georgia, Department of City-County Planning."

A *Source* record is required for each and every GFI source. Each *Source* record will have one or more associated *Quality* records.

3.1.1.14.6.1 Purpose

The *Source* record describes a source for MTAIP processing.

ReqID-15707   TIGER data ingest SHALL accept a *Source* record describing the TIGER data contained in the Southbound files.

ReqID-15708   TIGER data ingest SHALL accept *Source* records describing each GFI source of data to be used in MTAIP processing.

3.1.1.14.6.2 Obligation

The obligation for the *Source* record is Required. One or more *Source* records will be present in the Southbound metadata to define and describe the source of data to be used in MTAIP processing.

ReqID-15711   TIGER data ingest SHALL accept one or more *Source* metadata records containing a *Source* record.

3.1.1.14.6.3 Source Metadata Header Record Fixed Fields

The *RecordID* fixed field of the Source Metadata Header Record (Table 3.1.1.14-2) is the *SourceID*, and is used by other records in referencing the *Source*.

ReqID-15714   TIGER data ingest SHALL accept Source Metadata Header Record Fixed Fields as defined in 3.1.1.14.3.

ReqID-15715   The *SourceID* SHALL be defined as the 10 character *RecordID* in the fixed field of the Source Metadata Header Record.

3.1.1.14.6.4 Source Metadata Header Record Variable Field

ReqID-15717   TIGER data ingest SHALL accept the Source Metadata Header Record Variable Field as defined below.

3.1.1.14.6.4.1 Tags

ReqID-15719   The tags for the *Source* field SHALL be as follows:

Initial tag: <SOU>   Ending tag: </SOU>

3.1.1.14.6.4.2 Structure

ReqID-15722   A *Source* field SHALL be composed of sub-fields, structured as follows:

<SOU>CensusSourceFile:SourceDescription</SOU>

3.1.1.14.6.4.3 Construction

ReqID-15725   A metadata record SHALL contain no more than one *Source* field.

ReqID-15726   A *Source* field SHALL open with an initial tag, defined per 3.1.1.14.6.4.1.

ReqID-15727   A *Source* field SHALL contain one *CensusSourceFile* sub-field.

ReqID-15728   The *CensusSourceFile* sub-field SHALL be a variable length element, consisting of a Census Bureau defined unique renaming of the source data.

ReqID-15729   The *CensusSourceFile* sub-field SHALL be constructed as defined immediately below:

ReqID-15730   The first element of the *CensusSourceFile* sub-field SHALL be the *FIPS state code*.

ReqID-15731   The *FIPS state code* element SHALL be the two character FIPS 5 code identifying the state (or equivalent entity) in which the source provides coverage.

ReqID-15732   The *FIPS state code* element SHALL be 00 (two zeros) if the file is multi-state. (A source is considered to be multi-state if the Census Bureau has determined that the purpose of the file is to provide coverage of more than one state.)

ReqID-15733   The *FIPS state code* element SHALL be right justified and zero-filled for values less than ten (e.g., 05).

ReqID-15734   There SHALL be no delimiter between the *FIPS state code* element and the following element.

ReqID-15735   The second element of the *CensusSourceFile* sub-field SHALL be the *FIPS county code*.

ReqID-15736   The *FIPS county code* element SHALL be the three character FIPS 6 code identifying the county (or equivalent entity) in which the source provides coverage.

ReqID-15737   The *FIPS county code* element SHALL be 000 (three zeros) if the file is multi-county. (A source is considered to be multi-county if the Census Bureau has determined that the purpose of the file is to provide coverage of more than one county.)

ReqID-15738   The *FIPS county code* element SHALL be right justified and zero-filled for values less than one hundred (e.g., 023, 008).

ReqID-15739   There SHALL be no delimiter between the *FIPS county code* element and the following element.

ReqID-15740   The third element of the *CensusSourceFile* sub-field SHALL be the *FIPS-55 code*.

ReqID-15741   The *FIPS-55 code* element SHALL be five (5) characters in length.

ReqID-15742   The *FIPS-55 code* element SHALL be the entity in which the source provides coverage, representing a County Subdivision, Subbarrio, Consolidated City, Place, or Alaska Native Regional Corporation.

ReqID-15743   The *FIPS-55 code* element SHALL be 00000 (five zeros) if the file covers multiple FIPS-55 entities.

ReqID-15744   The *FIPS-55 code* element SHALL be right justified and zero-filled for values less than five characters.

ReqID-15745   There SHALL be no delimiter between the *FIPS-55 code* element and the following element.

ReqID-15746   The fourth element of the *CensusSourceFile* sub-field SHALL be the *File date*.

ReqID-15747 The *File date* SHALL be an eight character date (YYYYMMDD), representing the "as of" date of the source data.

ReqID-15748 For files created from GIS, the reference date or the file date SHALL be used as the "as-of" date.

ReqID-15749 For files created via field data collection, the date of last update SHALL be used as the "as-of" date.

ReqID-15750 For files created from other source (e.g., imagery or hardcopy map), the date of the source SHALL be used as the "as-of" date.

ReqID-15751 If the "as-of" date is not known, the date of acquisition of the source SHALL be used for the *File date*.

ReqID-15752 There SHALL be no delimiter between the *File date* element and the following element.

ReqID-15753 The fifth element of the *CensusSourceFile* sub-field SHALL be the Census Bureau's *TED ID*.

ReqID-15754 The length of the *TED ID* element SHALL be six (6) characters.

ReqID-15755 When the source is a file within a multi-file dataset (e.g., individual images from DOQQs), the *TED ID* element SHALL be the alphanumeric code for a tile within the multi-file dataset-coding scheme.

ReqID-15756 The *TED ID* element SHALL be right justified and zero-filled for values less than six characters.

ReqID-15757 The value of the *TED ID* element for TIGER source SHALL be the letter T, followed by the *FIPS state code*, followed by the *FIPS county code*.

ReqID-15758 There SHALL be no delimiter between the *TED ID* element and the following element.

ReqID-15759 The sixth element of the *CensusSourceFile* sub-field SHALL be the *FeatureCode*.

ReqID-15760 The length of the *FeatureCode* element SHALL be variable, depending on the number of *FeatureTypeCodes* in the element.

ReqID-15761 The *FeatureCode* element SHALL consist of one or more *FeatureTypeCodes*, depending on the number and type of features that are contained within the source data.

ReqID-15762 A *FeatureTypeCode* SHALL be defined as a one (1)-character code identifying a feature type.

ReqID-15763 Values for *FeatureTypeCode* SHALL be as identified in Table 3.1.1.14-3.

Table 3.1.1.14-3 Values for Metadata FeatureTypeCode

FeatureTypeCode	Feature Type
A	Road feature
B	Rail feature
C	Miscellaneous transportation feature
E	Physical feature
F	Non-visible boundary feature
G	Point hydro feature
H	Linear hydro feature
I	Areal hydro feature
K	Area landmark feature

FeatureTypeCode	Feature Type
L	Point landmark feature
P	Reserved
S	Reserved
W	Pedestrian way feature

ReqID-15766   The **CensusSourceFile** sub-field SHALL be followed by a colon (:) character.

ReqID-15767   A **Source** field SHALL contain one *Source Description* statement.

ReqID-15768   The **SourceDescription** statement SHALL be in free text, describing the source file and/or a citation for the file.

ReqID-15769   A **Source** field SHALL close with an ending tag, defined per 3.1.1.14.6.4.1.

3.1.1.14.7 Quality Value Metadata Header Record

The **Quality Value** record is used to define the *Census Quality Value (CQV)* for all or part of a source used during MTAIP processing. One or more **Quality Value** records are required for each Source record.

3.1.1.14.7.1 Purpose

The **Quality Value** record defines a Census Quality Value associated with a source.

ReqID-15774   TIGER data ingest SHALL accept **Quality Value** records defining *CQVs* for every source to be used in MTAIP processing.

3.1.1.14.7.2 Obligation

The obligation of the **Quality Value** record is *Required*. One or more records will be present in the Southbound metadata for every source defined in a Source metadata record.

ReqID-15777   TIGER data ingest SHALL accept one or more metadata records containing a **Quality Value** record.

3.1.1.14.7.3 Quality Value Metadata Header Record Fixed Fields

The **RecordID** fixed field of the Quality Metadata Header Record (Table 3.1.1.14-2) is the **Quality ID,** and is used by other records in referencing the Quality Value.

ReqID-15780   TIGER data ingest SHALL accept Quality Value Metadata Header Record Fixed Fields as defined in 3.1.1.14.3.

ReqID-15781   The **QualityID** SHALL be defined as the 10 character **RecordID** fixed field of the Quality Metadata Header Record.

3.1.1.14.7.4 Quality Value Metadata Header Record Variable Field

ReqID-15783   TIGER data ingest SHALL accept the Quality Value Metadata Header Record Variable Field as defined below.

3.1.1.14.7.4.1 Tags

ReqID-15785   The tags for the *Quality Value* field SHALL be as follows:

Initial tag: <CQV>   Ending tag: </CQV>

3.1.1.14.7.4.2 Structure

ReqID-15788   The **Quality Value** field SHALL be composed of sub-fields, structured as follows:

<CQV>SourceID:QualityValue,FeatureType[:QualityValue,FeatureType]…</CQV>

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3.1.1.14.7.4.3 Construction

ReqID-15791   One metadata record SHALL contain no more than one *Quality Value* field.

ReqID-15792   A *Quality Value* field SHALL open with an initial tag, defined per 3.1.1.14.7.4.1.

ReqID-15793   A *Quality Value* field SHALL contain one *SourceID* sub-field, consisting of the ten character *SourceID*, identifying the *Source* for which the quality values apply.

ReqID-15794   The *SourceID* sub-field SHALL be followed by a colon (:) character.

ReqID-15795   A *Quality Value* field SHALL contain one or more *QualityValue/FeatureType* sub-fields, defining Census Quality Values for specific feature types and feature type characteristics.

ReqID-15796   The first element of the *QualityValue/FeatureType* sub-field SHALL be the *CQV*.

ReqID-15797   The *CQV* SHALL be a variable length numeric field with a value ranging from 0 (zero) to 255, without any zero-fill.

ReqID-15798   The *CQV* SHALL represent a relative quality ranking (255 is the highest value) that applies for the defined source, feature type, and characteristic.

ReqID-15799   There SHALL be a comma (,) character after the *CQV* element.

ReqID-15800   The second element of the *QualityValue/FeatureType* sub-field SHALL be the *FeatureType*, consisting of three alphanumeric characters, composed of two items.

ReqID-15801   The first item SHALL be a one character *FeatureTypeCode*, identifying the feature type for which the *CQV* applies.

ReqID-15802   The value of the *FeatureTypeCode* SHALL be defined according to the feature types in Table 3.1.1.14-3.

ReqID-15803   A value of zero (0) SHALL indicate that the *CQV* applies to all feature types in the source.

ReqID-15804   The second item within the *FeatureType* element SHALL be a two character *FeatureCharacteristicID*, identifying the characteristic for which the *CQV* applies.

ReqID-15805   The value for *FeatureCharacteristicID* SHALL be defined according to the characteristics in Table 3.1.1.14-4.

ReqID-15806   A value of 00 (double zero) SHALL indicate that the *CQV* applies to all feature characteristics for the specified *FeatureTypeCode*.

ReqID-15807   A value of 0R (zero-R) SHALL indicate that the *CQV* applies to all remaining feature characteristics for the specified *FeatureTypeCode*, not previously defined in an earlier *FeatureType* element within the *Quality Value* field.

ReqID-15810   The *QualityValue/FeatureType* sub-field SHALL be repeated until all combinations of quality value, feature type, and feature characteristic have been identified for the source.

ReqID-15811   There SHALL be a colon (:) prior to every additional *QualityValue/FeatureType* sub-field.

ReqID-15812   There SHALL be no colon after the final *QualityValue/FeatureType* sub-field.

ReqID-15813   A *Quality Value* field SHALL close with an ending tag, defined per 3.1.14.7.4.1.

Table 3.1.1.14-4 List of Characteristics

ID	Characteristic	ID	Characteristic
01	Feature: Census Feature Class	25	Rail: Gauge
02	Feature: Feature Name	26	Rail: Condition of railroad grade
03	Feature: Non-Census ID	27	Rail: Mass transit rail
04	Feature: Spatial accuracy	28	Rail: Track function
05	Reserved	29	Hydro: Direction of water flow
06	Feature: Address range	30	Hydro: Internal water line
07	Feature: Zip code	31	Hydro: Shoreline
08	Feature: Stack	32	Hydro: USGS Closure line flag
09	Feature: Median width	33	Hydro: Point Special feature class
10	Feature: Feature width	34	Hydro: Area Special feature class
11	Feature: Special segment type	35	Hydro: NHD GNIS ID
12	Feature: Special feature class	36	Hydro: NHD Hydrographic category
13	Feature: Decked	37	Hydro: NHD Feature code
14	Road: Barrier to Automobile Movement	38	Hydro: NHD Reach code
15	Road: Access to road	39	Hydro: NHD Reach date
16	Road: Traffic Flow Direction	40	Landmark: City hall feature
17	Road: Jurisdiction	41	Landmark: Police station feature
18	Road: Toll Road	42	Landmark: Fire department feature
19	Road: Number of lanes	43	Landmark: Library feature
20	Road: Embedded Rail	44	Landmark: Transportation feature class
21	Road: Speed limit	45	Landmark: Government or inst. feature class
22	Road: Surface type	46	Landmark: Commercial or other feature class
23	Road: Traversable median	47	Non-visible: Geographic entity type
24	Road: Vehicular trail	48	Non-visible: Cadastral boundary type

3.1.1.14.8 Tasking Metadata Header Record

The *Tasking* record is used in Southbound MTAIP data to define an activity by which MTAIP changes are to be made. The record may be referenced in a *Rule* record to identify activities in which a rule applies. A *Tasking* record may refer to a broad range of action, such as in the example: "Census Bureau MTAIP Contract with Harris Corporation to improve the accuracy of the TIGER dataset." The record may also be used to refer to a more specific activity, such as in the example "Harris Corp. Census Bureau MTAIP Processing Thread 10."

3.1.1.14.8.1 Purpose

The *Tasking* record establishes an activity reference record that identifies the activity in which changes to MTAIP data are being made.

ReqID-15818   TIGER data ingest SHALL accept *Tasking* records identifying an activity in which changes to MTAIP are to be made.

3.1.1.14.8.2 Obligation

The Obligation for the *Tasking* record is *Required*. A *Tasking* record will be present (and referenced in a *Means* record) in the Northbound data to define the processing thread used in MTAIP production. Additional *Tasking* records will be present if necessary to define an activity for use in a *Rule* record.

ReqID-15821   TIGER data ingest SHALL accept one or more metadata records containing a *Tasking* record.

3.1.1.14.8.3 Tasking Metadata Header Record Fixed Fields

The *RecordID* fixed field of the Tasking Metadata Header Record (Table 3.1.1.14-2) is the *Tasking ID*, and will be used by other records in referring to the *Tasking*.

ReqID-15824   TIGER data ingest SHALL accept Tasking Metadata Header Record Fixed Fields as defined in 3.1.1.14.3.

ReqID-15825   The *TaskingID* SHALL be defined as the 10 character *RecordID* fixed field of the Tasking Metadata Header Record.

3.1.1.14.8.4 Tasking Metadata Header Record Variable Field

ReqID-15827   TIGER data ingest SHALL accept the Tasking Metadata Header Record Variable Field as defined below.

3.1.1.14.8.4.1 Tags

ReqID-15829   The tags for the *Tasking* field SHALL be as follows:

> Initial tag: \<TAS>   Ending tag: \</TAS>

3.1.1.14.8.4.2 Structure

ReqID-15832   The *Tasking* field SHALL be composed of sub-fields, structured as follows:

> \<TAS>Description/citation\</TAS>

3.1.1.14.8.4.3 Construction

ReqID-15835   A metadata record SHALL contain no more than one (1) *Tasking* field.

ReqID-15836   A *Tasking* field SHALL open with an initial tag, defined per 3.1.1.14.8.4.1.

ReqID-15837   A *Tasking* field SHALL contain one *Tasking* statement.

ReqID-15838   The *Tasking* statement SHALL be in free text, identifying a *Tasking* in which changes to MTAIP data are to be made.

ReqID-15839   A *Tasking* field SHALL close with an ending tag, defined per 3.1.1.14.8.4.1.

3.1.1.14.9 Means Metadata Header Record

The *Means* record is used in Southbound MTAIP data to report the means (source) for MTAIP data.

3.1.1.14.9.1 Purpose

The *Means* record provides a mechanism for reporting the means for MTAIP data. This record references all of the source, quality, authority, and rules that have a bearing on the data.

ReqID-15844   TIGER data ingest SHALL accept *Means* records identifying the means by which
MTAIP data are defined.

3.1.1.14.9.2 Obligation

The Obligation for the **Means** record is *Required*. A **Means** record will be present in the Southbound data
when referenced by another record in the Southbound files. The *Means* record may contain optional sub-
fields, depending on whether the means is based on an activity, source, quality value, authority, or rule.

ReqID-15847   TIGER data ingest SHALL accept one or more metadata records containing a *Means*
record.

3.1.1.14.9.3 Means Metadata Header Record Fixed Fields

The *RecordID* fixed field of the Means Metadata Header Record (Table 3.1.1.14-2) is the *Means ID*, also
referred to as the *MID*, the Spatial MID (*SMID*), and the Attribute MID (*AMID*).

ReqID-15850   TIGER data ingest SHALL accept *Means* Metadata Header Record Fixed Fields as
defined in 3.1.1.14.3.

ReqID-15851   The *MeansID* SHALL be defined as the 10 character *RecordID* fixed field of the Means
Metadata Header Record.

3.1.1.14.9.4 Means Metadata Header Record Variable Field

ReqID-15853   TIGER data ingest SHALL accept the *Means* Metadata Header Record Variable Field as
defined below.

3.1.1.14.9.4.1 Tags

ReqID-15855   The tags for the *Means* field SHALL be as follows:

Initial tag: <MEA>   Ending tag: </MEA>

3.1.1.14.9.4.2 Structure

ReqID-15858   The **Means** field SHALL be composed of sub-fields, structured as follows:

<MEA>TaskingID,SourceID,QualityID,[QualityID,]AuthorityID,[RuleID,]</MEA>

3.1.1.14.9.4.3 Construction

ReqID-15861   One metadata record SHALL contain no more than one *Means* field.

ReqID-15862   A *Means* field SHALL open with an initial tag, defined per 3.1.1.14.9.4.1.

ReqID-15863   A *Means* field SHALL contain one *Tasking* sub-field, if the referenced *Tasking* was
relevant in determining the information for which the *Means* field provides a basis.

ReqID-15864   The *Tasking* sub-field SHALL consist of the following:

TaskingID   (a ten digit identifier for *Tasking*, per 3.1.1.14.8)

ReqID-15866   The *Tasking* sub-field SHALL be followed by a comma (,) character.

ReqID-15867   A *Means* field SHALL contain one *Source* sub-field, if the referenced *Source* was
relevant in determining the information for which the *Means* field provides a basis.

ReqID-15868   The *Source* sub-field SHALL consist of the following:

SourceID   (a ten digit identifier for a *Source*, per 3.1.1.14.6)

ReqID-15870   The *Source* sub-field SHALL be followed by a comma (,) character.

ReqID-15871   A *Means* field SHALL contain one or more *Quality* sub-fields, if a *Source* sub-field was present AND if the referenced *Quality value* was relevant in determining the information for which the *Means* field provides a basis.

ReqID-15872   Each *Quality* sub-field SHALL consist of the following:

       QualityID   (a ten digit identifier for a *QualityValue*, per 3.1.1.14.7)

ReqID-15874   The *Quality* sub-field SHALL be followed by a comma (,) character.

ReqID-15875   A *Means* field SHALL contain one or more *Authority* sub-fields, if the *Authority* was relevant in determining the information for which the *Means* field provides a basis.

ReqID-15876   Each *Authority* sub-field SHALL consist of the following:

       AuthorityID   (a ten digit identifier for an *Authority*, per 3.1.1.14.5)

ReqID-15878   The *Authority* sub-field SHALL be followed by a comma (,) character, unless the sub-field is the final element prior to the ending tag.

ReqID-15879   A *Means* field SHALL contain zero or more *Rule* sub-fields, if the *Rule* was relevant in determining the information for which the *Means* field provides a basis.

ReqID-15880   Each *Rule* sub-field SHALL consist of the following:

       RuleID   (a ten digit identifier for a *Rule*, per 3.1.1.14.4)

ReqID-15882   The *Rule* sub-field SHALL be followed by a comma (,) character, unless the sub-field is the final element prior to the ending tag.

ReqID-15883   A *Means* field SHALL close with an ending tag, defined per 3.1.1.14.9.4.1.

3.1.1.14.10 Comment Field

The *Comment* field is used to convey additional information for which no specific tag exists.

3.1.1.14.10.1 Purpose

The *Comment* field conveys information for which no tag exists. Comments are informative only and do not have the force of a requirement.

ReqID-15888   TIGER data ingest SHALL accept *Comment* fields containing free text information.

3.1.1.14.10.2 Obligation

The Obligation for the *Comment* field is *Optional*. When present, the *Comment* field is appended to the end of another header record.

ReqID-15891   TIGER data ingest SHALL accept zero or one Comment fields, when necessary to provide additional information about a header metadata record.

3.1.1.14.10.3 Tags

ReqID-15893   The tags for the *Comment* field SHALL be as follows:

       Initial tag: <CMT>   Ending tag: </CMT>

3.1.1.14.10.4 Structure

ReqID-15896   The *Comment* field SHALL be structured as follows:

    <CMT>Comment</CMT>

3.1.1.14.10.5 Construction

ReqID-15899   One metadata record SHALL contain no more than one *Comment* field.

ReqID-15900   A *Comment* field SHALL open with an initial tag, defined per 3.1.1.14.10.4.

ReqID-15901   A *Comment* field SHALL consist of an alphanumeric string of up to 1000 characters.

ReqID-15902   A *Comment* field SHALL close with an ending tag defined per 3.1.1.14.10.4.

3.1.2 Source Data

Source data provides the information necessary to align spatial features and to capture feature attributes.

ReqID-8194   Source data ingest SHALL have the capability to accept Tribal, State, County, and Local (TSC&L) GIS data for use in TIGER accuracy improvement and attribution capture.

ReqID-8195   Source data ingest SHALL have the capability to accept National Hydrography Dataset (NHD) in for use in TIGER accuracy improvement and attribution capture.

ReqID-8196   Source data ingest SHALL have the capability to accept commercial GIS data for use in TIGER accuracy improvement and attribution capture.

ReqID-8197   Source data ingest SHALL have the capability to accept commercial aerial photography/imagery for use in TIGER accuracy improvement and attribution capture.

ReqID-8198   Source data ingest SHALL have the capability to accept commercial satellite imagery for use in TIGER accuracy improvement.

ReqID-8199   Source data ingest SHALL have the capability to accept field-collected data for use in TIGER accuracy improvement and attribution capture.

ReqID-11934   Source data ingest SHALL take any source data with a datum other than NAD83 and convert the source datum to NAD83.

3.1.2.1 GIS Source Files (TSC&L and commercial)

GIS source fields have been subdivided into two categories: (1) Census Bureau provided TSC&L files and (2) contractor provided commercial files. The Census Bureau provided files will be certified as meeting spatial accuracy requirements or as needing additional contractor provided imagery to meet spatial accuracy requirements. It is the responsibility of the contractor to provide commercial data that will produce an end product that meets the performance requirements of 4.1.

ReqID-104   Source data ingest SHALL accept all Census Bureau provided TSC&L datasets for processing regardless of spatial accuracy considerations provided that a deviation is provided by the Census Bureau for files that do not meet the performance requirements of 4.1, but are directed for use.

ReqID-13072   In counties for which Census Bureau provided TSC&L data is not available, the contractor SHALL provide and ingest data that will produce a delivered product that meets the performance requirements for road accuracy (ref. 4.1).

ReqID-8437   Source data ingest SHALL accept TSC&L and commercial GIS files covering all or only a portion of a county.

ReqID-2588   Source data ingest SHALL accept TSC&L and commercial GIS files with any level of feature attribution.

3.1.2.2 National Hydrographic Dataset

In counties (or county equivalents) for which no TSC&L hydrographic file has been provided by the Census Bureau, high-resolution files from the National Hydrography Dataset (NHD) are used for the alignment and attribution of hydrographic features in the TIGER database.

When referring to NHD files, this document uses the term "medium-resolution" for those files at 1:100,000 scale, and "high-resolution" for those files of a scale larger than 1:100,000 (e.g. 1:24,000).

ReqID-16096   Source data ingest SHALL not accept any medium-resolution NHD files.

ReqID-16097   Source data ingest SHALL not accept NHD data in counties for which a TSC&L hydrographic file has been provided.

ReqID-16098   Source data ingest SHALL not accept any NHD features of feature type "Swamp/Marsh."

ReqID-9093   Source data ingest SHALL accept high-resolution NHD files in counties for which that data is available and no TSC&L hydrographic file has been provided.

ReqID-9591   If high-resolution NHD files are available for only a partial coverage of the county, source data ingest SHALL accept high-resolution NHD exclusively, regardless of the amount of coverage within the county, or the availability of medium-resolution NHD data.

ReqID-9094   Source data ingest SHALL accept the following NHD data elements:

> Common ID (ref. 3.1.4.4.1.1)
>
> Feature Name (ref. 3.1.4.4.1.3)
>
> GNIS ID (ref. 3.1.4.4.1.15)
>
> Feature Code (ref. 3.1.4.4.1.16)
>
> Reach Code (ref. 3.1.4.4.1.17)
>
> Reach Date (ref. 3.1.4.4.1.18)

3.1.2.3 Imagery

ReqID-8446   The contractor SHALL have the capability to ingest imagery including optical, LIDAR, and IFSAR for the purposes of aligning visible features.

ReqID-8447   For any thread requiring imagery source data to achieve MTAIP product performance requirements, the contractor SHALL obtain and ingest source data of sufficient quality such that the spatial accuracy of the road features will satisfy the performance requirements of 4.1.

ReqID-8450   For any thread requiring imagery to align features other than road features, the source data ingest SHALL accept Census Bureau provided DOQQ datasets.

3.1.2.4 Field Collected Data (GPS)

Field Collected GPS data is used in certain processing threads as the methodology for acquiring road features. The acquired data is then used to align roads during the feature alignment process.

ReqID-8443   For those threads in which field collected data is the primary source for road alignment, the contractor SHALL supply and ingest data at sufficient quality such that the resultant delivered product will achieve the MTAIP product performance requirements of 4.1.

ReqID-9119   Field Data Collection SHALL capture all roads as defined in 3.1.4.2.

ReqID-11982   Field Data Collection SHALL capture the names of roads as they appear on street signs or as posted in the area.

ReqID-8444   Field Data Collection SHALL collect the following attribute as defined in 3.1.4.2.1.

>   Barrier to Automobile Movement

ReqID-9113   Field Data Collection SHALL capture roads with medians as multiple lines.

Only physical barriers (such as grass, jersey walls, etc.) constitute "medians". Painted markings alone do not constitute "medians".

Additional road lines should not be captured for medians that exist solely at intersections (such as to facilitate traffic flow) with the exception of physically divided turn lanes/ramps. Turn lanes and ramps with lanes separated by a traffic island should be captured as additional line(s).

Intermittent physical barriers (away from intersections) constitute a median for the purposes of additional road lane capture. However, only cross streets (or attribution changes) cause a break in segmentation.

ReqID-9116   Field Data Collection SHALL capture roads on bridges or in tunnels for the length of road within that feature.

3.1.2.5 Derived Imagery and Geospatial Products - Reserved

3.1.2.6 Paper Products - Reserved

3.1.3 Source Data Processing

3.1.3.1 General Requirements

ReqID-2568   Source Data Processing SHALL have the capability to view and manipulate geospatial information from various sources, consistent with the definition of the threads.

ReqID-2569   Source Data Processing SHALL have the capability to utilize multiple sources, of multiple types, in multiple formats, consistent with the definition of the threads.

ReqID-2570   Source Data Processing SHALL have the capability to utilize multiple sources with overlapping coverage.

ReqID-2571   Source Data Processing SHALL have the capability to resolve potentially conflicting information based on measures of source quality (defined as Census Quality Values – CQVs).

ReqID-16099   When TSC&L hydrographic data has been provided by the Census Bureau, Source Data Processing SHALL spatially adjust TIGER hydrographic features using ONLY the TSC&L hydrographic data.

ReqID-16100   When TSC&L hydrographic data has NOT been provided by the Census Bureau, Source Data Processing SHALL spatially adjust TIGER hydrographic features using ONLY high-resolution NHD hydrographic data, if available.

ReqID-16101   Any TIGER hydrographic features that are not matched during spatial adjustment SHALL be subject to the same default rules as any other unmatched TIGER features.

ReqID-16103   Source Data Processing SHALL capture hydrographic attribution from only the source used for hydrographic feature alignment.

3.1.3.2 Production Threads

Production Threads provide the capability to determine the optimum combination of source data to use to improve the TIGER data.

ReqID-881   The following ground rules SHALL apply to every thread:

- DOQQs are used only as reference data, unless specifically identified otherwise in the threads below.

- NHD entries in the tables below constitute a requirement to use NHD in hydrographic feature alignment, as well as attribution.

- Imagery source is commercial (optical, IFSAR, or LIDAR).

- Boundary matching with adjacent county partitions is always performed.

- For contractor provided source data (field collection, imagery, and commercial GIS), no values will be returned for Non-Census ID (Local ID).

The MTAIP Production Threads are described below.

3.1.3.2.1 Thread 1

Thread 1 uses good TSC&L GIS source for all feature classes.

ReqID-8203   For Thread 1, road feature improvements SHALL be based on TSC&L GIS.

ReqID-8204   For Thread 1, hydro feature improvements SHALL be based on TSC&L GIS.

ReqID-8205   For Thread 1, rail & other feature improvements SHALL be based on TSC&L GIS.

ReqID-8206   For Thread 1, boundary improvements SHALL be based on TSC&L GIS.

ReqID-8207   For Thread 1, structure/address harvesting SHALL be based on TSC&L GIS.

3.1.3.2.2 Thread 2

Thread 2 uses good TSC&L GIS for the Roads and Boundaries layers and other sources for remaining feature classes.

ReqID-8208   For Thread 2, road feature improvements SHALL be based on TSC&L GIS.

ReqID-8209   For Thread 2, hydro feature improvements SHALL be based on NHD.

ReqID-8210   For Thread 2, rail features already existing in TIGER SHALL be spatially improved based on DOQQ imagery for counties identified by the Census Bureau as a qualifying subset of GBF/DIME File counties. [Note: The Census Bureau delivered the qualifying subset as GFI on 2/20/2003.]

ReqID-8211   For Thread 2, boundary improvements SHALL be based on TSC&L GIS.

ReqID-8212   For Thread 2, structure/address harvesting SHALL be based on TSC&L GIS.

3.1.3.2.3 Thread 3

Thread 3 uses good TSC&L GIS for the Roads, Boundaries, and Hydro layers and other sources for the remaining feature classes.

ReqID-8213   For Thread 3, road feature improvements SHALL be based on TSC&L GIS.

ReqID-8228   For Thread 3, hydro feature improvements SHALL be based on TSC&L GIS.

ReqID-8229　　　For Thread 3, rail features already existing in TIGER SHALL be spatially improved based on DOQQ imagery for counties identified by the Census Bureau as a qualifying subset of GBF/DIME File counties. [Note: The Census Bureau delivered the qualifying subset as GFI on 2/20/2003.]

ReqID-8216　　　For Thread 3, boundary improvements SHALL be based on TSC&L GIS.

ReqID-8217　　　For Thread 3, structure/address harvesting SHALL be based on TSC&L GIS.

3.1.3.2.4　Thread 4

Thread 4 uses multiple partial GIS files combined to cover all feature classes and the entire extent of the county.

ReqID-8218　　　For Thread 4, road feature improvements SHALL be based on multiple partial TSC&L GIS.

ReqID-8219　　　For Thread 4, hydro feature improvements SHALL be based on multiple partial TSC&L GIS.

ReqID-8220　　　For Thread 4, rail features already existing in TIGER SHALL be spatially improved based on DOQQ imagery for counties identified by the Census Bureau as a qualifying subset of GBF/DIME File counties. [Note: The Census Bureau delivered the qualifying subset as GFI on 2/20/2003.]

ReqID-8221　　　For Thread 4, boundary improvements SHALL be based on multiple partial TSC&L GIS.

ReqID-8222　　　For Thread 4, structure/address harvesting SHALL be based on multiple partial TSC&L GIS, in the regions for which it is available.

3.1.3.2.5　Thread 5

Thread 5 uses field data collection for Roads and other sources for the remaining feature classes. Boundary improvements and structure/address harvesting are not included in this thread.

ReqID-8223　　　For Thread 5, road feature improvements SHALL be based on field data collection.

ReqID-8224　　　For Thread 5, hydro feature improvements SHALL be based on NHD.

ReqID-8225　　　For Thread 5, rail features already existing in TIGER SHALL be spatially improved based on DOQQ imagery for counties identified by the Census Bureau as a qualifying subset of GBF/DIME File counties. [Note: The Census Bureau delivered the qualifying subset as GFI on 2/20/2003.]

3.1.3.2.6　Thread 6

Thread 6 uses commercial GIS for Roads and other sources for the remaining feature classes. Boundary improvements and structure/address harvesting are not included in this thread.

ReqID-8230　　　For Thread 6, road feature improvements SHALL be based on commercial GIS.

ReqID-8231　　　For Thread 6, hydro feature improvements SHALL be based on NHD.

ReqID-8232　　　For Thread 6, rail features already existing in TIGER SHALL be spatially improved based on DOQQ imagery for counties identified by the Census Bureau as a qualifying subset of GBF/DIME File counties. [Note: The Census Bureau delivered the qualifying subset as GFI on 2/20/2003.]

3.1.3.2.7 Thread 7

Thread 7 uses imagery for Roads and Rails, and other sources for the remaining feature classes. Boundary improvements and structure/address harvesting are not included in this thread.

ReqID-8235   For Thread 7, road feature spatial improvements SHALL be based on imagery.

ReqID-8236   For Thread 7, hydro feature improvements SHALL be based on NHD.

ReqID-8237   For Thread 7, rail features already existing in TIGER SHALL be spatially improved based on imagery for counties identified by the Census Bureau as a qualifying subset of GBF/DIME File counties. [Note: The Census Bureau delivered the qualifying subset as GFI on 2/20/2003.]

3.1.3.2.8 Thread 8

Thread 8 uses partial extent TSC&L GIS coverage with field data collect to fill voids for Roads, and other sources for the remaining feature classes.

ReqID-8240   For Thread 8, road feature improvements SHALL be based on partial TSC&L GIS and some field data collection.

ReqID-8241   For Thread 8, hydro feature improvements SHALL be based on either TSC&L GIS or NHD (but not both).

ReqID-8242   For Thread 8, rail features already existing in TIGER SHALL be spatially improved based on DOQQ imagery for counties identified by the Census Bureau as a qualifying subset of GBF/DIME File counties. [Note: The Census Bureau delivered the qualifying subset as GFI on 2/20/2003.]

ReqID-8243   For Thread 8, boundary improvements SHALL be based on partial TSC&L GIS.

ReqID-8244   For Thread 8, structure/address harvesting SHALL be based on partial TSC&L GIS, in the regions for which it is available.

3.1.3.2.9 Thread 9

Thread 9 uses partial extent TSC&L GIS with commercial GIS to fill in surrounding areas for Roads, Boundary, and Structure/Address harvesting, and other sources for the remaining feature classes.

ReqID-8245   For Thread 9, road feature improvements SHALL be based on partial TSC&L GIS and some commercial GIS.

ReqID-8246   For Thread 9, hydro feature improvements SHALL be based on NHD.

ReqID-8247   For Thread 9, rail features already existing in TIGER SHALL be spatially improved based on DOQQ imagery for counties identified by the Census Bureau as a qualifying subset of GBF/DIME File counties. [Note: The Census Bureau delivered the qualifying subset as GFI on 2/20/2003.]

ReqID-8248   For Thread 9, boundary improvements SHALL be based on partial TSC&L GIS.

ReqID-8249   For Thread 9, structure/address harvesting SHALL be based on partial TSC&L GIS, in the regions for which it is available.

3.1.3.2.10 Thread 10

Thread 10 uses partial extent TSC&L GIS with imagery for surrounding area for Roads and Boundary, and other sources for the remaining feature classes.

ReqID-8250   For Thread 10, road feature improvements SHALL be based on partial TSC&L GIS and commercial imagery.

ReqID-8251   For Thread 10, hydro feature improvements SHALL be based on NHD.

ReqID-8252   For Thread 10, rail features already existing in TIGER SHALL be spatially improved based on imagery for counties identified by the Census Bureau as a qualifying subset of GBF/DIME File counties. [Note: The Census Bureau delivered the qualifying subset as GFI on 2/20/2003.]

ReqID-8253   For Thread 10, boundary improvements SHALL be based on partial TSC&L GIS.

ReqID-8254   For Thread 10, structure/address harvesting SHALL be based on partial TSC&L GIS, in the regions for which it is available.

3.1.3.2.11 Thread 11

Thread 11 uses partial extent TSC&L GIS with imagery and field data collection for portions of the surrounding area for Roads, and other sources for the remaining feature classes.

ReqID-8255   For Thread 11, road feature improvements SHALL be based on partial TSC&L GIS, with some commercial imagery, and field collection.

ReqID-8256   For Thread 11, hydro feature improvements SHALL be based on NHD.

ReqID-8257   For Thread 11, rail features already existing in TIGER SHALL be spatially improved based on partial TSC&L GIS and imagery for counties identified by the Census Bureau as a qualifying subset of GBF/DIME File counties. [Note: The Census Bureau delivered the qualifying subset as GFI on 2/20/2003.]

ReqID-8258   For Thread 11, boundary improvements SHALL be based on partial TSC&L GIS.

ReqID-8259   For Thread 11, structure/address harvesting SHALL be based on partial TSC&L GIS, in the regions for which it is available.

3.1.3.2.12 Reserved

3.1.3.2.13 Thread 13

Thread 13 uses TSC&L GIS (covering the complete county) with insufficient spatial accuracy but good attribution combined with imagery to enhance the spatial location accuracy for Roads, and other sources for the remaining feature classes.

ReqID-8265   For Thread 13, road feature spatial improvements SHALL be based on TSC&L GIS, commercial imagery, and DOQQ imagery.

ReqID-13073   For thread 13, road feature attributes SHALL be based on TSC&L GIS

ReqID-8266   For Thread 13, hydro feature improvements SHALL be based on NHD.

ReqID-8267   For Thread 13, rail features already existing in TIGER SHALL be spatially improved based on imagery for counties identified by the Census Bureau as a qualifying subset of GBF/DIME File counties. [Note: The Census Bureau delivered the qualifying subset as GFI on 2/20/2003.]

ReqID-8268   For Thread 13, boundary improvements SHALL be based on partial TSC&L GIS.

ReqID-8269   For Thread 13, structure/address harvesting SHALL be based on TSC&L GIS.

3.1.3.2.14 Thread 14

Thread 14 uses partial extent TSC&L GIS with insufficient spatial accuracy but good attribution combined with imagery to enhance the spatial location accuracy and to fill in surrounding areas for Roads, and other sources for the remaining feature classes.

ReqID-8270   For Thread 14, road feature spatial improvements SHALL be based on partial TSC&L GIS and commercial imagery.

ReqID-13074   For Thread 14, road feature attributes SHALL be based on partial TSC&L GIS and commercial imagery.

ReqID-8271   For Thread 14, hydro feature improvements SHALL be based on NHD.

ReqID-8272   For Thread 14, rail features already existing in TIGER SHALL be spatially improved based on imagery for counties identified by the Census Bureau as a qualifying subset of GBF/DIME File counties. [Note: The Census Bureau delivered the qualifying subset as GFI on 2/20/2003.]

ReqID-8273   For Thread 14, boundary improvements SHALL be based on partial TSC&L GIS.

ReqID-8274   For Thread 14, structure/address harvesting SHALL be based on partial TSC&L GIS, in the regions for which it is available.

3.1.3.2.15 Thread 15

Thread 15 uses good TSC&L GIS for Roads and other sources for the remaining feature classes. Boundary improvements and structure/address harvesting are not included in this thread.

ReqID-15966   For Thread 15, road feature improvements SHALL be based on TSC&L GIS.

ReqID-15967   For Thread 15, hydro feature improvements SHALL be based on NHD.

ReqID-15968   For Thread 15, rail features already existing in TIGER SHALL be spatially improved based on DOQQ imagery for counties identified by the Census Bureau as a qualifying subset of GBF/DIME File counties. [Note: The Census Bureau delivered the qualifying subset as GFI on 2/20/2003.]

3.1.3.3 Discrepancy Resolution

Discrepancy resolution occurs when there are inconsistencies in the source data covering the same area.

ReqID-8312   Discrepancy resolution SHALL use the source data with the highest Census Quality Value (CQV) in the areas of overlapping coverage.

ReqID-2680   Discrepancy resolution SHALL create a single coverage, complete with edge matching, where multiple data sources are available for a county.

ReqID-9595   Discrepancy resolution SHALL report any unresolved issues with discrepancy resolution to the Census Bureau.

3.1.3.4 Interior County Seams (Edge Matching within a County)

Seams or edges within current county boundaries may result when multiple sources are required in order to align and attribute all areas of the county.

ReqID-8430   Feature alignment SHALL match features across all interior seams.

ReqID-8431   Feature alignment SHALL utilize the quality rankings for every source to determine which feature will be given priority in the matching and adjustment processes.

ReqID-8432   Feature alignment SHALL have the capability to positionally adjust nodes and chains to make points and lines that are coincident/collinear on the ground be represented as coincident/collinear in the improved TIGER data.

ReqID-8433   Feature alignment SHALL assign means codes to the 0-cells and 1-cells that are adjusted during the edge matching, based on the source to which the cells were matched.

3.1.3.5 Alignment With Adjacent Counties

Boundary TIGER data for all adjacent counties is included with each TIGER county data set and is used during MTAIP edge matching. Edge matching consists of comparing the spatial CQV of adjacent county TIGER data with the spatial CQV of subject county source data, then "matching" the subject county TIGER data to the data set with the higher spatial CQV.

ReqID-2395   Feature alignment SHALL match the edges of the subject county and every adjacent county, using the adjacent county boundary rings identified in 3.1.1.1.2.

ReqID-12330   Common 0-cells SHALL be made to be coincident.

ReqID-12331   Common 1-cells SHALL be made to be collinear.

ReqID-2396   Feature alignment SHALL utilize the *Census Quality Values* (CQVs) provided by the Census Bureau in the metadata as GFI, or calculated by the contractor for Contractor Furnished Information (CFI).

ReqID-12335   A subject county 0-cell or 1-cell SHALL be moved only if the corresponding 0 or 1-cell in the adjacent county has the higher CQV.

              For the purpose of determining the higher CQV for a given 0-cell or 1-cell, the following conditions apply:

ReqID-15951   If, for a given 0-cell or 1-cell, the subject county and the adjacent county have the same CQV, then the county whose source is more recent SHALL be deemed to have the higher CQV (for the purpose of edge matching).

              (The vintage of a source is defined in the **Source Metadata Header Record** *CensusSourceFile File date* (ref. 3.1.1.14.6.4.3 for GFI, and 3.1.5.1.8.3.4.4.3 for CFI).

ReqID-12342   A subject county border 0-cell SHALL be matched to the common 0-cell in the adjacent county TIGER data if the CQV of that adjacent county 0-cell is higher than the CQV of the 0-cell in the subject county source data.

ReqID-12343   A subject county border 0-cell SHALL remain unmatched to the common adjacent county TIGER 0-cell if that adjacent county 0-cell has the lower CQV.

ReqID-12339   A subject county border 1-cell SHALL be matched to the common 1-cell in the adjacent county TIGER data if the CQV of that adjacent county 1-cell is higher than the CQV of the 1-cell in the subject county source data.

              When a subject county border 1-cell is matched to the common 1-cell in an adjacent county, attributes and characteristics will be returned for the subject county source arc, rather than the adjacent county arc. (ref. 3.1.4.1.2.4).

ReqID-12340   A subject county border 1-cell SHALL remain unmatched to the adjacent county TIGER 1-cell if that adjacent county 1-cell has the lower CQV.

              In this case, the subject county border 1-cell is matched to the subject county source data (if present), per nominal alignment processing (ref. 3.1.4.1.2).

ReqID-2400   Feature alignment SHALL provide the Census Bureau with a pairing of every matching 0-cell and every matching 1-cell between the two counties, indicating which had the higher CQV.

ReqID-2401   Data elements and formats for returned edge matching data SHALL be as identified in 3.1.5.2.

3.1.3.6 Structure/Address Harvesting

For the purposes of the MTAIP, Structure/Address Harvesting is defined as "taking existing structure and address information from TSC&L GIS files and putting that data into a common format for potential use later."

ReqID-8287   Structure/Address Harvesting SHALL consist of:

Extracting the mapped data types from the local files

Placing harvested data into a file for potential use later

Records that contain structure coordinates but no associated addresses are not returned to the Census Bureau.

Records that contain addresses but no associated structure coordinates are not returned to the Census Bureau.

3.1.3.6.1 Data Mapping

ReqID-388   Structure/Address Harvesting SHALL map data fields in the TSC&L GIS file to the appropriate fields in the Address Harvesting Data Element Dictionary.

ReqID-389   Structure/Address Harvesting SHALL assign null values to any Address Harvesting Data Elements that are not contained within the TSC&L GIS file.

3.1.3.6.2 Processing Harvested Data

ReqID-393   Structure/Address Harvesting SHALL capture structures that exist as single points in the source data as a single points in the output file.

ReqID-394   Structure/Address Harvesting SHALL capture structures that exist as polygons in the source data as a single point within the polygon in the output file.

3.1.3.6.3 Data Transforms

ReqID-391   Structure/Address Harvesting SHALL perform any data transforms necessary to convert the source address data to the required data output formats.

3.1.3.7 Calculation of Census Quality Values

The central theme of the MTAIP is correcting the spatial and attribute accuracy of TIGER data. This will take place over time as additional sources are added providing higher data quality.

Census Quality Values (CQVs) are measures of relative data quality useful in ranking various sources in terms of their spatial quality and attribute quality. These values are used during MTAIP processing as a primary factor in spatial improvement and the assignment of attributes.

3.1.3.7.1 Spatial Quality Values

MTAIP spatial CQVs range from 0 to 255, where 255 is the highest quality value. All TIGER and source data are assigned quality values for use in improvement processing. Certain "absolute boundaries" and some state boundaries and county partition edges are assigned high quality values blocked out for

assignment by the Census Bureau (values from 200 to 255). One such example is the border between Canada and the United States, which is defined by international treaty, clearly marked and maintained, and precisely geopositioned.

All Government Furnished Information (GFI), to include TIGER data and GFI source data are assigned spatial CQVs by the Census Bureau. This data is provided to the MTAIP contractor via the Southbound Record Type M. Each and every feature references the spatial quality value. Features from different sources have different spatial CQVs. Different feature types from the same source may have different spatial CQVs, depending on the relative spatial quality of feature layers in the source.

All Contractor Furnished Information, to include purchased source and collected source, will be assigned spatial CQVs by the contractor using the processes defined herein. These processes are equivalent to those used by the Census Bureau for GFI, and thus provide a consistent relative measure of spatial data quality.

ReqID-14784   Source Processing SHALL have the capability to calculate spatial quality values for Contractor Furnished Information.

ReqID-14785   Spatial quality values SHALL be calculated for each individual dataset, including purchased source and collected source data.

ReqID-14786   Calculated spatial quality values SHALL be based on the horizontal accuracy of the source data.

ReqID-14787   Where there are different horizontal accuracy values for different features, Source Processing SHALL calculate different spatial quality values for horizontal accuracy value and apply the CQV to the appropriate feature(s).

ReqID-14788   Source Processing SHALL calculate spatial Census Quality Values (CQVs) using the equation in Figure 3.1.3.7.

$$CQV = 101 - 5.5m + 0.3178065*(m - 13.2639)^2 - 0.007968*(m - 13.2639)^3 + 0.0004752*(m - 13.2639)^4 - 0.0000218*(m - 13.2639)^5$$

where m = horizontal accuracy, in meters

Figure 3.1.3.7 Calculation of Spatial Census Quality Values (CQVs)

ReqID-15953   The calculated CQV SHALL be an integer, ranging from 0 (zero) to 199.

ReqID-15954   CQVs calculated to be less than 0 (zero) SHALL be set to 0.

ReqID-15955   CQVs calculated to have a decimal value SHALL be rounded to the nearest whole number, as follows:

Decimal values greater than or equal to .5 are rounded up.

Decimal values less than .5 are rounded down.

The calculated spatial CQVs will be used in Improvement Processing (defined in 3.1.4) and in Improved TIGER Data Output (defined in 3.1.5).

3.1.3.7.2 Attribute Quality Values

ReqID-14793   The default CQV for the following NHD characteristics SHALL be 199.

> GNIS ID
>
> Name
>
> Reach Code
>
> Reach Date

ReqID-14798   The default CQV for the following NHD characteristics SHALL be 99.

> Hydrographic category
>
> Flow direction

3.1.4 Feature Improvement

Feature Improvement enhances the spatial and characteristics, or attributes, associated with the improved TIGER vectors to the extent available within the source data for each county or county equivalent entity.

3.1.4.1 General Requirements

This section defines general rules and requirements for improving TIGER data using source data. The section is divided into two parts. The first deals with matching TIGER features to source features, and includes requirements for aligning existing features, adding new features, and deleting non-existent features. The second deals with capturing attributes and characteristics from the source features and associating them with matched TIGER features.

Feature matching and attribute/characteristic capture guidance are contained within Volume II, Conflation and Production Scenarios.

3.1.4.1.1 General Feature Matching Requirements

This section provides general requirements for matching TIGER features with those in the source.

Feature matching is the process by which TIGER features are aligned to source data with regard to spatial location and shape.

3.1.4.1.1.1 Matched Features

Feature Improvement generally maintains the size of TIGER features relative to overlapping source features. The subject of breaking TIGER features at the seams of overlapping source features will be addressed during the MTAIP project.

ReqID-14455   Feature Improvement SHALL match existing TIGER features with features in the source data.

ReqID-14456   New TIGER features SHALL be added where there are additional features in the source.

ReqID-14457   Matched features SHALL be assigned a ***Match status*** value of M = Matched.

ReqID-190   Feature Improvement SHALL accurately portray the feature with the minimum number of shape points as are necessary to avoid spatial error greater than the defined horizontal accuracy requirements.

3.1.4.1.1.2 Unmatched Features

ReqID-189   Existing TIGER features that are not matched SHALL be proportionally moved or deleted, according to the permissions granted in the Southbound data and according to the circumstances of no match, as defined below.

3.1.4.1.1.2.1 Adjusted Unmatched Linear Features

ReqID-14468   When a linear feature type is *not present* in the source (meaning that a match is not possible), the feature SHALL be assigned a ***Match status*** value of X = Not Applicable.

ReqID-14469   When a linear feature *cannot be verified* because of limitations in the source (e.g., the feature may be obscured or not distinguishable), the TIGER feature SHALL be assigned a ***Match status*** value of X = Not Applicable.

ReqID-14470   When a linear feature has a ***Match status*** value of X, Feature Improvement SHALL proportionally move the feature, based on the spatial adjustment of matched features in the area of the unmatched feature.

ReqID-14471   During proportional movement, Feature Improvement SHALL maximize the preservation of the existing shape and relative location of non-matched linear features.

ReqID-14472   When a linear feature cannot be matched in the source (even though the feature type is present in the source and even though the area of the feature is not obscured or indistinguishable), and when the feature has a RT-1 ***Delete/Keep flag*** value of K, then Feature Improvement SHALL return the feature in the Northbound spatial and attribute files.

ReqID-14473   When a linear feature cannot be matched in the source (even though the feature type is present in the source and even though the area of the feature is not obscured or indistinguishable), and when the feature has a RT-1 ***Delete/Keep flag*** value of K, then Feature Improvement SHALL proportionally move the feature and add a Match status value of N = Not Matched.

3.1.4.1.1.2.2 Deleted Unmatched Linear Features

ReqID-14475   When a linear feature cannot be matched in the source (even though the feature type is present in the source and even though the area of the feature is not obscured or indistinguishable), and when the feature has a RT-1 ***Delete/Keep flag*** value of D, then Feature Improvement SHALL Omit the linear feature from the Northbound spatial and attribute files.

ReqID-14476   When a linear feature cannot be matched in the source (even though the feature type is present in the source and even though the area of the feature is not obscured or indistinguishable), and when the feature has a RT-1 ***Delete/Keep flag*** value of D, then Feature Improvement SHALL identify the deleted linear feature in the Northbound Metadata file.

3.1.4.1.1.2.3 Changed Unmatched Linear Features

If a linear TIGER feature cannot be matched and cannot be deleted (per the requirements above), there are additional possible courses of action, as follows.

C = HID was converted from one CFC to another, hence the original feature was deleted.

M = The line feature on this HID must be deleted. Harris is confident the feature does not exist in its current location and keeping it there has a detrimental effect on the line network of this feature type.

ReqID-14481   The feature SHALL be returned in the Northbound spatial and attribute files.

ReqID-14482   The feature SHALL be assigned a ***Match status*** value of N.

ReqID-14483   The feature SHALL be assigned a ***Line delete flag*** value of C or M (as appropriate per above).

ReqID-14484   The feature match condition SHALL be flagged in the Northbound metadata.

3.1.4.1.1.2.4 Unmatched Geographic Entities, Areas, and Points

ReqID-14486   When a geographic entity, area feature, or point feature cannot be matched to the source (*Match status* value of N), then Feature Improvement SHALL omit the feature from the Northbound spatial and attribute files.

ReqID-14487   When a geographic entity, area feature, or point feature cannot be matched to the source (*Match status* value of N), then Feature Improvement SHALL identify the deleted feature in the Northbound metadata file.

3.1.4.1.1.3 Maintaining TIGER Topology

ReqID-9010   Feature Improvement SHALL maintain 1-cell connectivity when adjusting the coordinates of non-matched features.

ReqID-9011   When the topology of the source differs from that of existing TIGER, Feature Improvement SHALL add any necessary new lines (with all available feature characteristics and attributes, as defined herein).

ReqID-14297   Feature Improvement SHALL maintain connectivity between existing features, except as allowed in ReqID-14489, below.

ReqID-14298   Feature Improvement SHALL maintain TIGER topology between existing and new features, except as allowed in ReqID-14489, below.

ReqID-14489   Feature Improvement SHALL accomplish any necessary changes to TIGER topology in accordance with the guidelines and scenarios provided in Volume II.

3.1.4.1.2 General Attribute and Characteristic Capture Requirements

When a TIGER feature is matched to a source feature, the TIGER feature is assigned the attributes and characteristics of the source feature. Feature Improvement maintains the association of the source and the attributes and characteristics assigned to the TIGER feature so that the source is identified in the Northbound files.

Existing TIGER attributes and characteristics (from the Southbound MTAIP files) are retained, though they are not returned to the Census Bureau in the Northbound files.

All attributes and characteristics captured from source files are returned in the Northbound files, even if the information is identical to existing TIGER data in the Southbound files.

ReqID-8492   Feature Improvement SHALL capture attributes and characteristics when a TIGER feature is matched with a source feature, in accordance with specific requirements for each feature class (per 3.1.4.2 through 3.1.4.9).

Note: An exception to this requirement for certain edge matching conditions is defined in 3.1.4.1.2.4.

ReqID-9609   Feature Improvement SHALL maintain an association between new attributes and characteristics and their source so that the source for new information can be identified in the Northbound attribute files.

3.1.4.1.2.1 Multiple Sources

Attributes and characteristics that are captured from multiple sources (according to the processing thread) are returned for each source, even if information from multiple sources is identical (or contradictory). The Northbound attribute files will return attributes and characteristics captured from different sources in different records.

ReqID-14501   When a TIGER feature is matched to multiple sources (according to the processing thread), Feature Improvement SHALL capture all attributes and characteristics associated with each matched source.

3.1.4.1.2.2 Multiple Values for an Attribute

When a single source contains multiple values for the same attribute or characteristic, each value will be captured and associated with the source. The Northbound attribute files will return each value, using additional records to convey the additional data.

ReqID-14503   When a single source has provided more than one value for an attribute or characteristic, Feature Improvement SHALL maintain every value for the feature (and its association with the source).

3.1.4.1.2.3 Unmatched TIGER Features

When a TIGER feature is not matched to a source feature, the TIGER feature is not assigned any attributes or characteristics, and there are no Northbound attribute records for that feature for that source.

ReqID-14506   TIGER features SHALL inherit attributes from the source data only if the feature is identified as "matched" to the source data.

3.1.4.1.2.4 Edge Matching Exception to Attribute Capture

An exception to the general attribute and characteristic capture requirements (above) applies when, during edge matching, a subject county border 1-cell is matched to the common 1-cell in the adjacent county TIGER data (according to the criteria defined in 3.1.3.5). Attributes and characteristics are captured and returned from the corresponding *subject county source arc* (if present), rather than from the matched TIGER 1-cell in the adjacent county.

ReqID-16090   When, during edge matching, a subject county border 1-cell is matched to the common 1-cell in the adjacent county TIGER data, Feature Improvement SHALL NOT capture attributes or characteristics from the adjacent county TIGER 1-cell.

ReqID-16091   When, during edge matching, a subject county border 1-cell is matched to the common 1-cell in the adjacent county TIGER data, Feature Improvement SHALL capture attributes and characteristics from the corresponding subject county source arc, if present.

3.1.4.2 Road Features

ReqID-14507   Feature Improvement SHALL process road features in accordance with the source and processing requirements of the subject county production thread (ref. 3.1.3.4), as well as the general feature matching requirements of 3.1.4.1.1, and specific road feature requirements of 3.1.4.2.1.

ReqID-8521   Feature Improvement SHALL capture the following roads: all primary roads, interstate highways, limited access roads, secondary roads, connecting roads, county roads, neighborhood roads, city streets and other vehicular roads except as excluded by the following statement:

> For Thread 5 field collect counties, cemetery roads and city/local park roads are not captured unless there is an indication of living quarters.

Roads may be undivided or divided, go through tunnels, appear as underpasses and have rail lines in the center.

ReqID-8524   When a road feature is marked as matched, Feature Improvement SHALL assign a CFCC of "A" to the feature.

3.1.4.2.1 Attributes and Characteristics for Road Features

ReqID-14508   Attributes and characteristics of source features SHALL be captured in accordance with the general attribute capture requirements of 3.1.4.1.2, and specific road feature requirements of 3.1.4.2.2.

3.1.4.2.1.1 Non-Census ID

ReqID-8525   Feature Improvement SHALL capture the **Non-census ID** of all matched (captured) features when Non-Census Ids are present in a TSC&L GIS file.

ReqID-14509   When the source is TSC&L GIS file, the **Non-Census ID** SHALL be the local ID in the TSC&L GIS file. When the TSC&L GIS file does not identify a field as the local ID, the **Non-census ID** should be a unique identifier of the feature in the source, if one is present.

3.1.4.2.1.2 Reserved

3.1.4.2.1.3 Feature Name

ReqID-13497   Feature Improvement SHALL capture **Feature name**, to the extent described below.

ReqID-14512   GIS source SHALL be used to capture **Feature name**, when available in the source, and according to the production thread.

ReqID-14513   Field data collection SHALL be used to capture **Feature name**, when the name is available from road signs, and according to the production thread.

ReqID-14514   The field SHALL be empty when not available in the source.

3.1.4.2.1.4 Address Range

ReqID-13501   GIS source SHALL be used to capture **Address range**, when available in the source, and according to the production thread.

ReqID-13502   **Left FROM address** SHALL be captured, when available.

ReqID-13503   **Left TO address** SHALL be captured, when available.

ReqID-13504   **Right FROM address** SHALL be captured, when available.

ReqID-13505   **Right TO address** SHALL be captured, when available.

ReqID-14515   The field(s) SHALL be empty when not available in the source.

3.1.4.2.1.5 Zip Codes

ReqID-13506   GIS source SHALL be used to capture **Zip code**, when available in the source, and according to the production thread.

ReqID-13507   **Left side zip code** SHALL be captured, when available.

ReqID-13508   **Right side zip code** SHALL be captured, when available.

ReqID-14516   The field(s) SHALL be empty when not available in the source.

3.1.4.2.1.6 FROM Stack

Stack levels are separations of the surface levels of road features overlapping or under lapping with other features.

ReqID-14517   GIS source SHALL be used to capture **FROM Stack**, when available in the source, and according to the production thread.

ReqID-8540   The **FROM Stack** attribute indicates the level of the feature relative to all features coming together at the endpoint, and SHALL be encoded as follows:

ReqID-12435   The value of **FROM Stack** SHALL be an integer.

ReqID-8541   A negative value SHALL indicate that the end point is below grade (below ground level).

ReqID-14519   A value of -1 SHALL indicate that the end point is a single level below grade.

ReqID-14520   A value of -2 SHALL indicate that the end point is one level below the -1 level.

ReqID-8542   A zero (0) value SHALL indicate the end point is at grade (at ground level).

ReqID-8543   A positive integer value SHALL indicate that the end point is above grade (above ground level).

ReqID-14521   A value of +1 SHALL indicate that the end point is a single level above grade.

ReqID-12735   A value of +2 SHALL indicate that the end point is one level above the +1 level.

ReqID-14522   A value of +3 SHALL indicate that the end point is one level above the +2 level.

ReqID-14523   The field SHALL be empty when not available in the source.

A positive value for the level may be assumed, unless the value is zero (0) or has an explicit negative sign.

3.1.4.2.1.7 TO Stack

Stack levels are separations of the surface levels of intersecting roads and other features.

ReqID-14525   GIS source SHALL be used to capture **TO Stack**, when available in the source, and according to the production thread.

ReqID-12740   The **TO Stack** attribute indicates the level of the feature relative to all features coming together at the endpoint, and SHALL be encoded as follows:

ReqID-12741   The value of **TO Stack** SHALL be an integer.

ReqID-12742   A negative value SHALL indicate that the end point is below grade.

ReqID-14527   A value of -1 SHALL indicate that the end point is a single level below grade.

ReqID-14528   A value of -2 SHALL indicate that the end point is one level below the -1 level.

ReqID-12743   A zero (0) value SHALL indicate the end point is at grade.

ReqID-12744   A positive integer value SHALL indicate that the end point is above grade.

ReqID-14529   A value of +1 SHALL indicate that the end point is a single level above grade.

ReqID-12745   A value of +2 SHALL indicate that the end point is one level above the +1 level.

ReqID-14530   A value of +3 SHALL indicate that the end point is one level above the +2 level.

ReqID-14531   The field SHALL be empty when not available in the source.

A positive value for the level may be assumed, unless the value is zero (0) or has an explicit negative sign.

3.1.4.2.1.8 Median Width

This attribute records the width of the median of a divided highway that is shown in the GIS source as a single line feature.

ReqID-8545   *Median width* SHALL be captured from GIS source files, when available in the source, and according to the processing thread.

ReqID-8547   Feature Improvement SHALL capture *Median width* when a double line feature is represented in the TIGER data and the GIS source is represented as a single line feature.

ReqID-15560   A value of -1 SHALL indicate that there is no median.

ReqID-8548   *Median width* SHALL be stated in meters, rounded to the nearest whole number.

ReqID-14534   The field SHALL be empty when not available in the source.

3.1.4.2.1.9 Road Feature Width

The *Road feature width* attribute records the road feature width in meters, rounded to the nearest whole number.

ReqID-14535   *Road feature width* SHALL be captured from GIS source files, when available in the source, and according to the production thread.

ReqID-13510   *Road feature width* SHALL be stated in meters, rounded to the nearest whole number.

ReqID-14538   The field SHALL be empty when not available in the source.

3.1.4.2.1.10 Special Segment Type

This characteristic applies to special segment types that may occur within road features. The data to be collected depends on the production thread.

ReqID-8557   GIS source SHALL be used to capture the *Special segment type* characteristic, Tunnels, Bridges, Ferries, Dams, and Levees, when available in the source, and according to the production thread.

ReqID-14539   The end points of the TIGER feature SHALL be adjusted and/or split, as necessary to match the spatial aspects of the special segment type.

ReqID-12436   The *Special segment type* characteristic SHALL be encoded as follows:

   B = Bridge. The road feature is on a bridge.

   D = Dam. The road feature is constructed over a man-made or earthen dam.

   F = Ferry. The road feature is a ferry crossing.

   L = Levee. The road feature is constructed over a levee.

   T = Tunnel. The road feature is within a tunnel.

ReqID-14540   The field SHALL be empty when not available in the source.

3.1.4.2.1.11 Decked

This characteristic indicates rail or subway above or below a road feature, or a decked road. A decked road is one in where the roads are built on top of one another.

ReqID-14541   GIS source SHALL be used to capture the *Decked* characteristic, when available in the source, and according to the production thread.

ReqID-8589   The *Decked* characteristic SHALL be encoded as follows:

   A = Rail above the road feature

   B = Rail below the road feature

   R = Decked road features

N = The feature is not decked

ReqID-14545 The field SHALL be empty when not available in the source.

3.1.4.2.1.12 Barrier to Automobile Movement

This characteristic indicates a barrier to automobile traffic. The characteristic is carried by a 0-cell located at the barrier point. *The Barrier to automobile movement* characteristic is carried as the 0-cell *Special feature type* in MTAIP Southbound data.

ReqID-14546 Feature Improvement SHALL capture the *Barrier to automobile movement* characteristic, to the extent described below.

ReqID-14547 GIS source SHALL be used to capture Cul-de-sacs, fixed barriers, gated barriers, and toll booths, when available in the source, and according to the processing thread.

ReqID-14548 Imagery source SHALL be used to capture Cul-de-sacs, when visible in the source, and according to the processing thread.

ReqID-14549 Field data collection SHALL be used to capture Cul-de-sacs characteristic, according to the processing thread.

ReqID-12746 The road segment containing the barrier SHALL be split at the point of the barrier.

ReqID-13078 The coordinates of the 0-cell created by the splitting of the 1-cell SHALL be returned in the Northbound **Spatial File for Point Features**.

ReqID-8567 The *Barrier to automobile movement* characteristic SHALL be captured as a point attribute and returned in the Northbound **Point Feature Attribute Table**.

ReqID-8572 The *Barrier to automobile movement* characteristic SHALL be encoded as follows:

C = Cul-de-sac

F = Fixed barrier to travel

G = Gated barrier to travel

T = Toll booth barrier to travel

ReqID-14551 The field SHALL be empty when not available in the source.

3.1.4.2.1.13 Access to Road

This characteristic describes the availability of traffic access to the road feature.

ReqID-14553 GIS source SHALL be used to capture the *Access to Road* characteristic, when available in the source, and according to the processing thread.

ReqID-8560 The *Access to road* characteristic SHALL be encoded as follows:

L = Limited. Access to the road feature is limited to ramps.

C = Controlled. Access to the road feature is limited to intersections at grade.

U = Unlimited. Access to the road feature is unlimited.

ReqID-12452 The field SHALL be empty when not available in the source.

3.1.4.2.1.14 Reserved

3.1.4.2.1.15 Traffic Flow Direction

This attribute indicates traffic flow along a road. Traffic flow may be one way or both ways.

ReqID-8603   GIS source SHALL be used to capture *Traffic flow direction*, when available in the
               source, and according to the processing thread.

ReqID-8598   The *Traffic flow direction* attribute SHALL be encoded as follows:

               F = One way, from the FROM node to the TO node

               T = One way, from the TO node to the FROM node

               B = Two way traffic

               V = Traffic direction varies

ReqID-14554   The field SHALL be empty when not available in the source.

3.1.4.2.1.16 FHWY Code

This attribute indicates the Federal Highway code assigned to some highways.

ReqID-8606   GIS source SHALL be used to capture *FHWY code*, when available in the source, and
               according to the processing thread.

ReqID-12458   The *FHWY code* characteristic SHALL be encoded as it appears in the source file.

ReqID-14555   The field SHALL be empty when not available in the source.

3.1.4.2.1.17 Jurisdiction

This characteristic identifies the type of entity that typically maintains the road.

ReqID-8616   GIS source SHALL be used to capture *Jurisdiction*, when available in the source, and
               according to the processing thread.

ReqID-8609   The *Jurisdiction* characteristic SHALL be encoded as follows:

               F = Federal (e.g., roads in national parks, national forest, and other federal lands)

               S = State (e.g. state highways, state roads, interstate highways)

               C = County (e.g. county routes)

               L = Local government

               P = Private

               T = Tribal or Bureau of Indian Affairs

               O = Other

ReqID-14556   The field SHALL be empty when not available in the source.

3.1.4.2.1.18 Toll Road

This characteristic identifies a road feature segment as belonging to a toll road.

ReqID-8621   GIS source SHALL be used to capture *Toll road*, when available in the source, and
               according to the processing thread.

ReqID-8619   The *Toll road* characteristic SHALL be encoded as follows:

               Y = Yes; the road feature is a toll road

               N = No; the road feature is not a toll road

ReqID-14558   The field SHALL be empty when not available in the source.

3.1.4.2.1.19 Number of Lanes

This attribute indicates the number of travel lanes from curb-to-curb within a road feature, independent of direction of travel or special status (center turn lanes, High-Occupancy-Vehicle designation, etc.).

ReqID-14559   GIS source SHALL be used to capture *Number of lanes*, when available in the source, and according to the processing thread.

ReqID-14561   The value of the *Number of lanes* field SHALL be an integer, representing the number of travel lanes.

ReqID-14562   The field SHALL be empty when not available in the source.

3.1.4.2.1.20 Embedded Rail

This characteristic indicates the presence of a rail line embedded in a road feature. This flag applies to the road feature only. The characteristics of the rail line are not captured on a road feature vector.

ReqID-14563   GIS source SHALL be used to capture *Embedded rail*, when available in the source, and according to the processing thread.

ReqID-8627   The *Embedded rail* characteristic SHALL be encoded as follows:

> B = Between lanes. The vehicular traffic flows in the same direction on both sides of the railway.

> M = In median. The vehicular traffic flows in opposing directions on each side of the railway.

> R = On roadway. The road and rail surface are integrated and road traffic can move where rail lines exist (e.g., a trolley track).

> U = Embedded rail of unknown type

ReqID-14566   The field SHALL be empty when not available in the source.

3.1.4.2.1.21 Special Feature Class

This characteristic identifies a road as having a special use class characteristic from the given Census-defined domain.

For portrayal guidelines on these *Special feature classes*, refer to Production Scenarios in *Volume II.*

ReqID-14567   A driveway SHALL be defined as a road or pathway that leads to a single structure where someone could live or work.

ReqID-14568   Feature Improvement SHALL capture the *Special feature class* characteristic, to the extent described below.

ReqID-8643   GIS source SHALL be used to capture *Special feature class*, when available in the source, and according to the processing thread.

ReqID-13491   Imagery source SHALL be used to capture driveways with a length greater than or equal to 50 meters, when visible in the source, and according to the processing thread.

ReqID-11456   The *Special feature class* characteristic SHALL be encoded as follows:

> A = Alley

> D = Driveway

> P = Parking lot road

R = Access ramp

S = Service or frontage road

ReqID-15565 The field SHALL be blank if the source identifies that the road feature is not one of the above types.

ReqID-15566 The field SHALL be empty when not available in the source.

3.1.4.2.1.22 Speed Limit

ReqID-8645 GIS source SHALL be used to capture *Speed limit*, when available in the source and according to the production thread.

ReqID-8646 The *Speed limit* attribute SHALL indicate the lowest speed indicated in the source file if speed varies over the length of the 1-cell.

ReqID-14570 The value of the field SHALL be in miles per hour.

ReqID-14571 The value of the field SHALL be zero (0) if the *Speed limit* is unknown.

ReqID-14572 The field SHALL be empty when not available in the source.

3.1.4.2.1.23 Road Surface Type

This characteristic identifies the surface type of the feature segment.

ReqID-14573 GIS source SHALL be used to capture *Road surface type*, when available in the source, and according to the processing thread.

ReqID-8649 The value of the *Road surface type* characteristic SHALL be encoded as follows:

P = Paved

N = Not paved

U = Unknown type

ReqID-14576 The field SHALL be empty when not available in the source.

3.1.4.2.1.24 Traversable Median

This characteristic indicates that in a single TIGER vector representing two-way traffic, a median exists between the lanes that is traversable by emergency vehicles (ambulance, fire, police vehicles).

ReqID-8660 GIS source SHALL be used to capture *Traversable median*, when available in the source data and according to the processing thread.

ReqID-8658 The value of the *Traversable Median* characteristic SHALL be encoded as follows:

Y = Yes; the median is traversable by an emergency vehicle

N = No; the median is not traversable by an emergency vehicle

ReqID-12456 The field SHALL be empty when not available in the source.

3.1.4.2.1.25 Vehicular Trail

This characteristic indicates a road is passable only by 4WD vehicle.

ReqID-8665 GIS Source SHALL be used to capture *Vehicular trail*, when available in the source data and according to the processing thread.

ReqID-11460 The value of the *Vehicular Trail* characteristic SHALL be encoded as follows:

Y = Yes; the road is a vehicular trail

N = No; the road is not a vehicular trail

ReqID-12454   The field SHALL be empty when not available in the source.

3.1.4.2.2 Divided/non-divided Roads and Highways

The portrayal of divided roads and highways is dependent on the source type.

3.1.4.2.2.1 GIS Source

ReqID-8668   When the source is GIS, Feature Improvement SHALL portray roads exactly as they appear in the source file, with the exception of compliance with the Tolerance and Snapping values in 4.2.

3.1.4.2.2.2 Imagery Source

ReqID-8669   When the source is imagery, Feature Improvement SHALL capture roads with photo identifiable medians as multiple lines.

Only physical barriers (such as grass, jersey walls, etc.) constitute "medians". Painted markings alone do not constitute "medians".

Additional road lines should not be captured for medians that exist solely at intersections (such as to facilitate traffic flow) with the exception of physically divided turn lanes/ramps. Turn lanes and ramps with lanes separated by a traffic island should be captured as additional line(s).

Intermittent physical barriers (away from intersections) constitute a median for the purposes of additional road lane capture. However, only cross streets (or attribution changes) cause a break in segmentation.

ReqID-8671   If there is no median present, Feature Improvement SHALL portray the road feature with one centerline for the road, located in the middle of the hard surface road, regardless of the number of lanes.

3.1.4.2.2.3 Field Data Collect Source

ReqID-16105   When the source is Field Data Collect, Feature Improvement SHALL portray divided and non-divided roads according to the requirements in 3.1.2.4.

3.1.4.2.3 Circles in Roads

ReqID-8673   Feature Improvement SHALL portray traffic circles in roads as they appear in GIS files, field data collect, or imagery.

3.1.4.2.4 Driveways

A driveway is defined as an unnamed road feature of greater than 50 meters and less than 150 meters in length, which does not connect any two roads together (a dead end). Driveways may have curvature.

ReqID-8677   If the source file is GIS (TSC&L or commercial), Feature Improvement SHALL portray all road features captured as driveways in the source file as matched or added to the improved TIGER file.

3.1.4.2.5 Parking Lots

ReqID-8682   Feature Improvement SHALL capture parking lots only as they appear in a TSC&L or commercial GIS files, as available.

3.1.4.2.6 Cul-De-Sacs

Cul-de-sacs are a special case of road feature. A *cul-de-sac* is a street closed at one end; the closed end has an area large enough for vehicles to turn around. Portrayal guidelines for cul-de-sacs appear in *Volume II*, Production Scenarios.

ReqID-8686   If the source file is GIS (TSC&L or commercial), Feature Improvement SHALL capture the cul-de-sacs as they are described in the source file.

ReqID-8688   If the source file is imagery or field collection, and if the circular feature at the end the road has any type of impediment to travel in the middle of the circular feature (a grassy area, a curb, a monument), Feature Improvement SHALL portray the circular feature as a circular road, and not as a cul-de-sac.

ReqID-8689   If the source file is imagery or field collection, and if the feature is a dead end road with a round widening at one end, Feature Improvement SHALL extend the TIGER vector so that the end node is placed in the center of the cul-de-sac.

3.1.4.3 Rail Features

This feature type includes all fixed rail or cable transportation.

ReqID-14580   Feature Improvement SHALL process rail features in accordance with the source and processing requirements of the subject county production thread (ref. 3.1.3.4), as well as the general feature matching requirements of 3.1.4.1.1, and specific rail feature requirements immediately below.

ReqID-8694   Feature Improvement SHALL capture all railroads as portrayed in GIS source files (as available).

ReqID-8696   Feature Improvement SHALL portray railroads centered on the tracks/right-of-ways.

ReqID-8697   Feature Improvement SHALL portray a railroad yard by representing the outermost tracks and all through tracks.

ReqID-8698   If two railroad tracks are present on same rail bed without a visible barrier or median, Feature Improvement SHALL portray them with one vector.

ReqID-13546   When TSC&L GIS source is not available, Feature Improvement SHALL use DOQQ imagery for spatial improvement of rail lines already existing in TIGER in counties for which the TIGER data is based on "old GBF/DIME files".

ReqID-8695   When a rail feature is marked as matched, Feature Improvement SHALL assign a CFCC of "B" to the feature.

3.1.4.3.1 Attributes and Characteristics Applicable to Railroad Features

ReqID-14581   Attributes and characteristics of source features SHALL be captured in accordance with the general attribute capture requirements of 3.1.4.1.2.

3.1.4.3.1.1 Non-Census ID

ReqID-11719   Feature Improvement SHALL capture the *Non-Census ID* of all matched (captured) features when Non-Census IDs are present in a TSC&L GIS file.

ReqID-14582   When the source is a TSC&L GIS file, the *Non-Census ID* SHALL be the local ID in the TSC&L GIS file. When the TSC&L GIS file does not identify a field as the local ID, the *Non-census ID* should be a unique identifier of the feature in the source, if one is present.

3.1.4.3.1.2 Reserved

3.1.4.3.1.3 Feature Name

ReqID-13518   Feature Improvement SHALL capture *Feature name* from GIS source, when available in the source, and according to the production thread.

ReqID-14585   The field SHALL be empty when not available in the source.

3.1.4.3.1.4 FROM Stack

Stack levels are separations of the levels of rail features overlapping or under lapping with other features.

ReqID-12749   Feature Improvement SHALL capture the *FROM Stack* attribute from GIS source, when available, and according to the production thread, indicating the relative levels of coincident rail features and other features.

ReqID-12751   The range and definition of values of the rail feature *FROM Stack* field SHALL be the same as those for the road feature *FROM Stack* field, as defined in 3.1.4.2.1.6.

ReqID-14586   The field SHALL be empty when not available in the source.

3.1.4.3.1.5 TO Stack

ReqID-12759   Feature Improvement SHALL capture the *TO Stack* attribute from GIS source, when available, indicating the relative levels of coincident rail features and other features.

ReqID-12761   The range and definition of values of the rail feature *TO Stack* field SHALL be the same as those for the road feature *TO Stack* field, as defined in 3.1.4.2.1.7.

ReqID-14588   The field SHALL be empty when not available in the source.

3.1.4.3.1.6 Special Segment Type

The *Special segment type* characteristic indicates the type of special segment represented by the feature.

ReqID-11815   Feature Improvement SHALL capture the *Special segment type* characteristic from GIS source, when available, and according to the production thread, indicating the segment type of the rail feature.

ReqID-14589   The end points of the TIGER feature SHALL be adjusted and/or split, as necessary to match the spatial aspects of the special segment type.

ReqID-11809   The *Special segment type* characteristic SHALL be encoded as follows:

> B = Bridge. The rail feature is on a bridge.
>
> D = Dam. The rail feature is constructed over a man-made or earthen dam.
>
> F = Ferry. The rail feature is a ferry crossing.
>
> L = Levee. The rail feature is constructed over a levee.
>
> T = Tunnel. The rail feature is within a tunnel.

ReqID-14590   The field SHALL be empty when not available in the source.

3.1.4.3.1.7 Decked

This characteristic is defined as a railroad or subway above or below another rail feature.

ReqID-8742   Feature Improvement SHALL capture the *Decked* characteristic from GIS source, when available, according to the production thread.

ReqID-8738   The *Decked* characteristic SHALL be encoded as follows:

> T = Decked rail features

> N = The feature is not decked

ReqID-14592   The field SHALL be empty when not available in the source.

3.1.4.3.1.8 Gauge

The *Gauge* attribute is the distance between rails of a track. The two gauges found within the United States are Standard, which is a rail separation of 4 feet 8.5 inches, and Narrow, which is any rail separation of less than 4 feet 8.5 inches. Narrow Gauge railroads are used mostly on private freight or scenic passenger lines.

ReqID-11816   Feature Improvement SHALL capture the *Gauge* attribute from GIS source, when available, indicating the rail separation of the rail feature.

ReqID-9079   When Narrow-Gauge rail occupies the same roadbed as a standard gauge rail, Feature Improvement SHALL capture only the Standard gauge rail.

ReqID-8732   The *Gauge* characteristic SHALL be encoded as follows:

> N = Narrow

> S = Standard

> B = Broad

ReqID-14593   The field SHALL be empty when not available in the source.

3.1.4.3.1.9 Special Feature Class

This characteristic refers to a Census-defined list of special rail types used in the TIGER database.

ReqID-8745   Feature Improvement SHALL capture the *Special feature class* characteristic from GIS source, when available in the source, and according to the processing thread.

ReqID-11817   The *Special feature class* characteristic SHALL be encoded as follows:

> C = Cog Rail Line

> I = Incline Rail Line

> L = Logging Tram

> S = Ski Lift

> T = Tram

ReqID-14594   The field SHALL be blank if the source identifies that the rail feature is not one of the above types.

ReqID-14595   The field SHALL be empty when not available in the source.

3.1.4.3.1.10 Condition of Railroad Grade

This characteristic indicates the condition of the track grade and if it has been abandoned. An abandoned railway is one that is no longer in use. When the track, ballast, and bridges are still in place, they may still be put to limited use. When the tracks are removed, the ballast and rails have been dismantled, but the cleared right-of-way is often still visible.

ReqID-8753   Feature Improvement SHALL capture the *Condition of railroad grade* characteristic from GIS source, when available, and according to the production thread.

ReqID-11818   The ***Condition of railroad grade*** characteristic SHALL be encoded as follows:

        T = Abandoned, track remains

        R = Abandoned, track removed

ReqID-14596   The field SHALL be blank if the source identifies that the rail feature is not abandoned.

ReqID-14597   The field SHALL be empty when not available in the source.

3.1.4.3.1.11 Mass Transit Rail

This characteristic indicates the type of railroad track. It is used when the rail line is not part of a road right-of-way.

ReqID-8758   Feature Improvement SHALL capture the ***Mass transit rail*** characteristic from GIS source, when available.

ReqID-11819   The ***Mass transit rail*** characteristic SHALL be encoded as follows:

        C = Carline

        S = Streetcar Track

        T = Trolleys

        M = Monorail

        O = Other Mass Transit Rail System

ReqID-14598   The field SHALL be blank if the source identifies that the rail feature is not a mass transit rail.

ReqID-14599   The field SHALL be empty when not available in the source.

3.1.4.3.1.12 Track Function

This characteristic identifies the use of the railroad tracks.

ReqID-8765   Feature Improvement SHALL capture the ***Track function*** characteristic from GIS source, when available, and according to the production thread.

ReqID-11820   The ***Track function*** characteristic SHALL be encoded as follows:

        M = Main

        S = Spur

        Y = Yard

ReqID-13585   Rapid transit lines designed to carry passengers between urban areas or between a city and outlying communities SHALL be portrayed as main-line railroads.

ReqID-9081   Feature Improvement SHALL only capture sidings if present in GIS source files. Sidings are short tracks, connected by switches or points with the main track, which allows trains to pass each other or provide storage for temporarily idle cars.

ReqID-14600   The field SHALL be empty when not available in the source.

3.1.4.4 Hydrographic Features

Hydrographic feature attributes and characteristics apply to point, linear, and areal water features.

ReqID-9086   Feature Improvement SHALL process hydro features in accordance with the source and processing requirements of the subject county production thread (ref. 3.1.3.4), as well as the general feature matching requirements of 3.1.4.1.1, and specific hydro feature requirements immediately below.

ReqID-8770   With the exception of features clearly designated as "Swamp" or "Marsh" type, Feature Improvement SHALL capture perennial and intermittent hydrography features as they are portrayed in TSC&L hydrographic files or high-resolution NHD files. Features that are clearly designated as "Swamp" or "Marsh" type should not be captured from any source.

ReqID-13545   Feature Improvement SHALL employ either TSC&L GIS or high-resolution NHD (but not both) for processing hydro features. TSC&L GIS will be the source if one or more TSC&L hydrographic files have been provided by the Census Bureau. If no TSC&L hydrographic files have been provided, the source will be high-resolution NHD.

ReqID-15958   Hydro attributes and characteristics SHALL be captured only from the source that was used for spatial improvement.

ReqID-8772   When a hydrography feature is marked as matched, Feature Improvement SHALL assign a CFCC of "H" to the feature.

Volume II defines scenarios for spatial improvement of hydro features as well as the capture of hydro attributes and characteristics.

3.1.4.4.1 Attributes and Characteristics for Hydrographic Features

ReqID-14601   Attributes and characteristics of source features SHALL be captured in accordance with the general attribute capture requirements of 3.1.4.1.2.

3.1.4.4.1.1 Non-Census ID

ReqID-14602   Feature Improvement SHALL capture the *Non-Census ID* of all matched (captured) features when Non-Census IDs are present in a TSC&L GIS file.

ReqID-12668   When the source is a TSC&L GIS file, the *Non-Census ID* SHALL be the local ID in the TSC&L GIS file. When the TSC&L GIS file does not identify a field as the local ID, the *Non-census ID* should be a unique identifier of the feature in the source, if one is present.

ReqID-12667   When the source is the National Hydrographic Dataset, the *Non-Census* ID SHALL be the NHD (Feature) *Common Identifier* (Com ID).

The *Com ID* is a ten-digit integer value that uniquely identifies each NHD feature.

3.1.4.4.1.2 Reserved

3.1.4.4.1.3 Feature Name

Feature names are typically assigned to the reach rather than the feature. Only if the feature does not have a reach associated with it does the feature carry the name.

ReqID-13520   Feature Improvement SHALL capture *Feature name*, to the extent described below:

ReqID-14606   GIS source SHALL be used to capture *Feature name*, when available in the source, and according to the processing thread.

ReqID-14607   NHD source SHALL be used to capture *Feature name*, when available in the source, and according to the processing thread.

ReqID-15561   If the NHD does not have a name for the specific feature, then the *Feature name* attribute SHALL be filled with the NHD *Reach name*, when available in the source.

ReqID-14608   The field SHALL be empty when not available in the source.

3.1.4.4.1.4 FROM Stack

Stack levels are separations of the levels of hydro features overlapping or under lapping with other features. The USGS NHD utilizes the Feature type designator "underpass", with a value of "above" and "below" to indicate places where hydro features cross at different elevations.

ReqID-12769   Feature Improvement SHALL capture the **FROM Stack** attribute from GIS source, when available, and according to the production thread, indicating the relative levels of coincident hydro features and other features.

ReqID-12771   Values of the hydro feature **FROM Stack** field SHALL be the same as the values for the road feature **FROM Stack** field, as defined in 3.1.4.2.1.6.

ReqID-14609   The field SHALL be empty when not available in the source.

3.1.4.4.1.5 TO Stack

Stack levels are separations of the levels of hydro features overlapping or under lapping with other features.

ReqID-12779   Feature Improvement SHALL capture the **TO Stack** attribute from GIS source, when available, and according to the production thread, indicating the relative levels of coincident hydro features and other features.

ReqID-12781   Values of the hydro feature **TO Stack** field SHALL be the same as the values for the road feature **TO Stack** field, as defined in 3.1.4.2.1.7.

ReqID-14610   The field SHALL be empty when not available in the source.

3.1.4.4.1.6 Hydro Feature Width

The **Hydro feature width** attribute is the width of the water feature in meters (rounded to the nearest whole number).

ReqID-8794   GIS source SHALL be used to capture hydro **Feature width**, when available in the source and according to the production thread.

ReqID-14611   Hydro **Feature width** SHALL be stated in meters, rounded to the nearest whole number.

ReqID-14612   The field SHALL be empty when not available in the source.

3.1.4.4.1.7 Direction of water flow

This attribute indicates the direction of the water feature flow.

ReqID-14613   GIS source SHALL be used to capture the **Direction of water flow** attribute, when available in the source and according to the production thread.

ReqID-14614   NHD source SHALL be used to capture the **Direction of water flow** attribute, when available in the source and according to the production thread.

ReqID-8797   **Direction of water flow** SHALL be encoded using the following codes:

F = From FROM node toward the TO node of the feature

T = From TO node toward the FROM node of the feature

B = Bi-directional flow

N = No flow

U = Unknown, not discernable

ReqID-14615   The field SHALL be empty when not available in the source.

3.1.4.4.1.8 Internal water line

This characteristic represents an internal, usually centerline, in double-line portrayed water feature. The line is a Census boundary, a GIS boundary, or a NHD artificial path or connector.

ReqID-14616   GIS source SHALL be used to capture the ***Internal water line*** characteristic with a value of C, A, or L (as identified below), when available in the source and according to the production thread.

ReqID-14617   NHD source SHALL be used to capture the ***Internal water line*** characteristic with a value of N (as identified below), when available in the source and according to the production thread.

ReqID-8809   This characteristic SHALL be encoded using the following codes:

>   C = Area Naming Boundary

>   N = NHD artificial path or connector, where the connector is within an areal hydro feature

>   A = Area Measurement Boundary

>   L = TSC&L GIS Internal Boundary line

ReqID-14619   The field SHALL be empty when not available in the source.

3.1.4.4.1.9 Shoreline

This characteristic indicates that a vector is the edge of double line water. The ***Shoreline*** characteristic may be provided in the source as one or more of five tidal levels (defined in the glossary).

ReqID-14620   GIS source SHALL be used to capture the Shoreline characteristic, when available in the source, and according to the production thread.

ReqID-14621   NHD source SHALL be used to capture the Shoreline characteristic, when available in the source, and according to the production thread.

ReqID-8833   The Shoreline characteristic SHALL be encoded as follows:

>   5 = Mean Low Low

>   4 = Mean Low

>   3 = Mean

>   2 = Mean High

>   1 = Mean High High

ReqID-14622   The field SHALL be blank if the source identifies that the hydro feature is not a shoreline.

ReqID-14623   The field SHALL be empty when not available in the source.

3.1.4.4.1.10 USGS Closure Line Flag

This characteristic indicates whether a linear hydro feature is a part of a USGS Closure Line.

ReqID-14626   GIS source SHALL be used to capture the ***USGS Closure line flag***, when available in the source and according to the production thread.

ReqID-14627   The ***USGS Closure line flag*** SHALL be encoded as follows:

>   Y = Yes; the linear hydro feature is a USGS closure line

N = No; the linear hydro feature is not a USGS closure line

ReqID-14630   The field SHALL be empty when not available in the source.

3.1.4.4.1.11 Hydrographic Category

The *Hydrographic category* characteristic indicates the portion of the year that a hydro feature contains water. *Intermittent* indicates that the feature contains water for only part of the year, but more than just after rainstorms and at snowmelt. *Perennial* indicates that the feature contains water throughout the year, except for infrequent periods of severe drought.

ReqID-14633   TSC&L hydro source SHALL be used to capture the *Hydrographic category* characteristic, when available in the source and according to the production thread.

ReqID-16003   NHD hydro source SHALL be used to capture the *Hydrographic category* characteristic, when available in the source and according to the production thread.

ReqID-16004   *Hydrographic category* SHALL be derived from the *Feature Code* attribute contained in the NHD, when NHD hydro source is used to capture the *Hydrographic category* characteristic.

ReqID-14634   The *Hydrographic category* characteristic SHALL be encoded as follows:

  P = Perennial

  I = Intermittent

  O = Other

ReqID-14638   The field SHALL be empty when not available in the source.

3.1.4.4.1.12 Linear Hydro Special Feature Class

This characteristic represents the Census Bureau-defined list of special hydro feature classes maintained in the TIGER database.

ReqID-8815   TSC&L source SHALL be used to capture the *Linear hydro special feature class* characteristic, when available in the source and according to the production thread.

ReqID-16005   NHD hydro source SHALL be used to capture the *Linear hydro special feature class* characteristic, when available in the source and according to the production thread.

ReqID-16006   *Linear hydro special feature class* characteristic SHALL be derived from the *Feature Code* attribute contained in the NHD, when NHD hydro source is used to capture the *Linear hydro special feature class* characteristic.

ReqID-14639   The *Linear hydro special feature class* characteristic SHALL be encoded as follows:

  A = Aqueduct

  B = Braided

  C = Canal/Ditch

  F = Fish Ladder

  L = Spillway

  M = Flume

  N = Connector

  R = River, Stream

  S = Siphon

ReqID-14640   The field SHALL be blank if the source identifies that the linear hydro feature is not one of the above special class features.

ReqID-14641   The field SHALL be empty when the hydro feature is not a linear feature.

ReqID-14642   The field SHALL be empty when not available in the source.

ReqID-8825   If the feature is a legal boundary in areal water, then it SHALL remain in its original position and not be moved to the artificial path.

3.1.4.4.1.13 Point Hydro Feature Class

ReqID-14644   TSC&L source SHALL be used to capture the *Point hydro feature class* characteristic, when available in the source, according to the production thread, and according to the feature type.

ReqID-16007   NHD hydro source SHALL be used to capture the *Point hydro feature class* characteristic, when available in the source, according to the production thread, and according to the feature type.

ReqID-16008   Point hydro feature class characteristics SHALL be derived from the *Feature Code* attribute contained in the NHD, when NHD hydro source is used to capture the *Point hydro feature class* characteristic.

ReqID-14645   The *Point hydro feature class* SHALL be encoded as follows:

> F = Fountain
>
> G = Geyser
>
> L = Waterfall
>
> M = Mud pot
>
> S = Spring
>
> W = Well

ReqID-14652   The field SHALL be blank if the source identifies that the point hydro feature is not one of the above special class features.

ReqID-14653   The field SHALL be empty when the hydro feature is not a point feature.

ReqID-14654   The field SHALL be empty when not available in the source.

3.1.4.4.1.14 Area Hydro Feature Class

ReqID-14656   TSC&L source SHALL be used to capture the *Area hydro feature class* characteristic, when available in the source, according to the production thread, and according to the feature type.

ReqID-16009   NHD hydro source SHALL be used to capture the *Area hydro feature class* characteristic, when available in the source, according to the production thread, and according to the feature type.

ReqID-16010   Area hydro feature class characteristics SHALL be derived from the *Feature Code* attribute contained in the NHD, when NHD hydro source is used to capture the *Area hydro feature class* characteristic.

ReqID-14657   The *Area hydro feature class* SHALL be encoded as follows:

> B = Bay

E = Estuary

G = Glacier/Ice mass

L = Lake/Pond

O = Ocean

P = Gravel pit - filled with water

R = Reservoir

S = Stream/River

ReqID-14667 The field SHALL be blank if the source identifies that the areal hydro feature is not one of the above special class features.

ReqID-14668 The field SHALL be empty when the hydro feature is not an areal feature.

ReqID-14669 The field SHALL be empty when not available in the source.

3.1.4.4.1.15 NHD GNIS ID

The Geographic Names Information System is the Federal government's primary source for identifying names. The **GNIS ID** is an eight-digit identifier for the NHD feature name.

ReqID-14672 The **GNIS ID** characteristic SHALL carry the NHD *GNIS ID*, when available.

ReqID-14673 The field SHALL be empty when not available in the source.

3.1.4.4.1.16 NHD Feature Code

The NHD Feature Code is a five-digit value, where the first three digits encode the feature type and the last two digits encode a set of characteristics and values that can be assigned to a type.

ReqID-14676 The **Feature Code** characteristic SHALL carry the NHD *Feature Code*, when available.

ReqID-14677 The field SHALL be empty when not available in the source.

3.1.4.4.1.17 NHD Reach Code

A Reach is a continuous, unbroken stretch or expanse of surface water. The **Reach Code** provides the means to link data to water features; they function like street addresses to roads.

The NHD **Reach Code** is a fourteen-digit value consisting of two parts. The first eight digits are the hydrologic unit code for the cataloging unit in which the reach exists. The last six digits are assigned in sequential order.

ReqID-14680 The **Reach Code** characteristic SHALL carry the NHD *Reach Code*, when available.

ReqID-14681 The field SHALL be empty when not available in the source.

3.1.4.4.1.18 NHD Reach Date

The NHD **Reach Date** is the date on which the reach code was assigned.

ReqID-14684 The **Reach Date** characteristic SHALL carry the NHD **Reach Date**, when available.

ReqID-14685 The field SHALL be empty when not available in the source.

3.1.4.5 Miscellaneous Transportation Features

These features are not major transportation routes, but are important for their landmark character and are often utilized as block or some other type of boundary within the TIGER database. Miscellaneous

transportation features include, but are not limited to: Powerlines, Pipelines, Conveyances, certain rail lines. Miscellaneous transportation features do not include roads, railroads, or pedestrian walkways.

ReqID-14686   Feature Improvement SHALL process miscellaneous transportation features in accordance with the source and processing requirements of the subject county production thread (ref. 3.1.3.4), as well as the general feature matching requirements of 3.1.4.1.1.

ReqID-8860   When a miscellaneous transportation feature is marked as matched, Feature Improvement SHALL assign a CFCC of "C" to the feature.

ReqID-14687   If the source does not specify the miscellaneous transportation feature as one of the special feature classes identified in 3.1.4.5.1.6, the feature SHALL be omitted from the Northbound files.

3.1.4.5.1 Attributes and Characteristics Applicable to Miscellaneous Features

ReqID-14688   Attributes and characteristics of source features SHALL be captured in accordance with the general attribute capture requirements of 3.1.4.1.2.

3.1.4.5.1.1 Non-Census ID

ReqID-11823   Feature Improvement SHALL capture the *Non-Census ID* of all matched (captured) features when Non-Census IDs are present in a TSC&L GIS file.

ReqID-14689   When the source is a TSC&L GIS file, the *Non-Census ID* SHALL be the local ID in the TSC&L GIS file. When the TSC&L GIS file does not identify a field as the local ID, the *Non-census ID* should be a unique identifier of the feature in the source, if one is present.

3.1.4.5.1.2 Reserved

3.1.4.5.1.3 Feature Name

ReqID-13527   Feature Improvement SHALL capture *Feature name* from GIS source, when available, according to the processing thread.

ReqID-14691   The field SHALL be empty when not available in the source.

3.1.4.5.1.4 FROM Stack

Stack levels are separations of the surface levels of miscellaneous transportation features overlapping or under lapping with other features.

ReqID-12789   Feature Improvement SHALL capture the *FROM Stack* attribute from GIS source, when available, and according to the production thread, indicating the relative levels of coincident miscellaneous transportation features and other features.

ReqID-12791   The range and definition of values of the miscellaneous transportation feature *FROM Stack* field SHALL be the same as those for the road feature *FROM Stack* field, as defined in 3.1.4.2.1.6.

ReqID-14692   The field SHALL be empty when not available in the source.

3.1.4.5.1.5 TO Stack

ReqID-12799   Feature Improvement SHALL capture the *TO Stack* attribute from GIS source, when available, and according to the production thread, indicating the relative levels of coincident miscellaneous transportation features and other features.

ReqID-12801   The range and definition of values of the miscellaneous transportation feature ***TO Stack*** field SHALL be the same as those for the road feature ***TO Stack*** field, as defined in 3.1.4.2.1.7.

ReqID-14693   The field SHALL be empty when not available in the source.

3.1.4.5.1.6 Special Feature Class

ReqID-8884   Feature Improvement SHALL capture the ***Special feature class*** characteristic from GIS source, when available, and according to the production thread, indicating the class of miscellaneous transportation feature.

ReqID-14694   The ***Special feature class*** characteristic SHALL be encoded as follows:

C = Conveyor

I = Pipeline

L = Powerline

R = Runway or taxiway

3.1.4.6 Landmark Features

Landmarks are cartographic points that represent a prominent identifying feature of a landscape. Landmarks in TIGER include point landmarks and area landmarks.

ReqID-14695   Feature Improvement SHALL process landmark features in accordance with the source and processing requirements of the subject county production thread (ref. 3.1.3.4), as well as the general feature matching requirements of 3.1.4.1.1.

ReqID-8891   When a point or area landmark feature is marked as matched, Feature Improvement SHALL assign a CFCC of "D" to the feature.

ReqID-14696   If the source does not specify a landmark as a city hall class feature (ref. 3.1.4.6.1.4), police station class feature (ref. 3.1.4.6.1.5), fire department class feature (ref. 3.1.4.6.1.6), library class feature (ref. 3.1.4.6.1.7), transportation class feature (ref. 3.1.4.6.1.8), government/institutional class feature (ref. 3.1.4.6.1.9), or commercial other class feature (ref. 3.1.4.6.1.10), then the feature SHALL be omitted from the Northbound files.

3.1.4.6.1 Attributes and Characteristics Applicable to Landmarks

ReqID-14697   Attributes and characteristics of source features SHALL be captured in accordance with the general attribute capture requirements of 3.1.4.1.2.

3.1.4.6.1.1 Non-Census ID

ReqID-12672   Feature Improvement SHALL capture the ***Non-Census ID*** of all matched (captured) features when Non-Census IDs are present in a TSC&L GIS file.

ReqID-14698   When the source is a TSC&L GIS file, the ***Non-Census ID*** SHALL be the local ID in the TSC&L GIS file. When the TSC&L GIS file does not identify a field as the local ID, the ***Non-census ID*** should be a unique identifier of the feature in the source, if one is present.

3.1.4.6.1.2 Reserved

3.1.4.6.1.3 Feature Name

ReqID-13531   Feature Improvement SHALL capture ***Feature name*** from GIS source, when available, according to the processing thread.

ReqID-14700   The field SHALL be empty when not available in the source.

3.1.4.6.1.4 City Hall Feature Class

This characteristic indicates if the landmark feature is (or contains) a city hall class feature (e.g., town hall, courthouse, county hall).

ReqID-14703   Feature Improvement SHALL capture the *City hall feature class* characteristic from GIS source, when available.

ReqID-14704   The *City hall feature class* landmark SHALL be encoded as follows:

> Y = Yes; the landmark feature includes a city hall class feature, and according to the production thread.

> N = The source does not indicate that the feature contains a city hall.

3.1.4.6.1.5 Police Station Feature Class

This characteristic indicates if the landmark feature is (or contains) a police station class feature.

ReqID-14709   Feature Improvement SHALL capture the *Police station feature class* characteristic from GIS source, when available, and according to the production thread.

ReqID-14710   The *Police station feature class* landmark SHALL be encoded as follows:

> Y = Yes; the landmark feature includes a police station class feature.

> N = The source does not indicate that the feature contains a police station.

3.1.4.6.1.6 Fire Department Feature Class

This characteristic indicates if the landmark feature is (or contains) a fire department class feature.

ReqID-14715   Feature Improvement SHALL capture the *Fire department feature class* characteristic from GIS source, when available, and according to the production thread.

ReqID-14716   The *Fire department feature class* landmark SHALL be encoded as follows:

> Y = Yes; the landmark feature includes a fire department class feature.

> N = The source does not indicate that the feature contains a fire department.

3.1.4.6.1.7 Library Feature Class

This characteristic indicates if the landmark feature is (or contains) a library class feature.

ReqID-14721   Feature Improvement SHALL capture the *Library feature class* characteristic from GIS source, when available, and according to the production thread.

ReqID-14722   The *Library feature class* landmark SHALL be encoded as follows:

> Y = Yes; the landmark feature includes a library class feature.

> N = The source does not indicate that the feature contains a library.

3.1.4.6.1.8 Transportation

This characteristic indicates the landmark represents a feature associated with transportation.

ReqID-14725   Feature Improvement SHALL capture the *Transportation feature class* characteristic from GIS source, when available, and according to the production thread.

ReqID-8914   The *Transportation feature class* characteristic SHALL be encoded as follows:

> A = Airport structure

        B = Bus terminal

        H = Helicopter landing pad

        M = Marine terminal

        P = Seaplane anchorage

        S = Subway station

        T = Train station

ReqID-14726   The field SHALL be empty if the landmark is not designated in the source as a transportation class feature.

3.1.4.6.1.9 Government/Institutional

This characteristic indicates the landmark represents a feature associated with government or other institutional use.

ReqID-14727   Feature Improvement SHALL capture the *Government/Institutional feature class* characteristic from GIS source, when available, and according to the production thread.

ReqID-8923   The *Government/Institutional feature class* characteristic SHALL be encoded as follows:

        A = National Park Service area

        B = Halfway house

        C = Convent or monastery

        E = Educational institution

        F = National forest or other federal land

        G = Government center

        H = Hospital

        I = County home

        J = Custodial facility, jail, detention center, federal penitentiary, state prison, or prison farm

        L = Shelter or mission

        M = Military installation

        N = Nursing home, retirement home, or home for the aged

        O = Orphanage

        P = Post office

        R = Religious institution

        S = State or local park or forest

        U = Urbanización: identifiable community developments in Puerto Rico

        Y = Cemetery

ReqID-14728   The field SHALL be empty if the landmark is not designated in the source as a government/institution class feature.

3.1.4.6.1.10 Commercial/Other

This characteristic indicates the landmark represents a feature associated with commercial or other use.

ReqID-14729   Feature Improvement SHALL capture the ***Commercial/Other feature class*** characteristic from GIS source, when available, and according to the production thread.

ReqID-8946   The ***Commercial/Other feature class*** characteristic SHALL be encoded as follows:

   A = Amusement center

   C = Campground

   E = Employment center

   G = Golf course

   H = Hotel, motel, resort, spa, YMCA, or YWCA

   I = Industrial building or industrial park

   L = Lookout tower, designed for occupancy/staffing (e.g., fire tower)

   M = Marina

   N = Named island

   O = Office building or office park

   P = Mountain peak or other topologic feature

   S = Shopping center or major retail center

   T = Tower/beacon, designed to be non-occupied/staffed (e.g., radio tower)

ReqID-15562   The field SHALL be empty if the landmark is not designated in the source as a commercial or other class feature.

3.1.4.7 Non-Visible Features

Non-visible features are defined as delimitations of geographic entities, property areas, tabulation areas, or political boundaries. Feature Improvement may modify the alignment of non-visible boundaries to maintain their shape. In order to maintain topology, new non-visible segments may be added to maintain shape.

ReqID-8982   Feature Improvement SHALL process non-visible features in accordance with the source and processing requirements of the subject county production thread (ref. 3.1.3.4), as well as the general feature matching requirements of 3.1.4.1.1 and the specific requirements of 3.1.4.7.2.

ReqID-8983   Edge-matching non-visible political boundaries between counties or county-equivalents SHALL be accomplished as indicated in sections 3.1.3.3 and 3.1.5.2.

ReqID-8985   When a non-visible feature is marked as matched, a CFCC of "F" SHALL be assigned to the feature.

3.1.4.7.1 Attributes and Characteristics Applicable to Non-Visible Features

ReqID-14732   Attributes and characteristics of source features SHALL be captured in accordance with the general attribute capture requirements of 3.1.4.1.2.

3.1.4.7.1.1 Non-Census ID

ReqID-12673   Feature Improvement SHALL capture the ***Non-census ID*** of all matched (captured) features when Non-Census IDs are present in a TSC&L GIS file.

ReqID-14733   When the source is a TSC&L GIS file, the ***Non-Census ID*** SHALL be the local ID in the TSC&L GIS file. When the TSC&L GIS file does not identify a field as the local ID, the ***Non-census ID*** should be a unique identifier of the feature in the source, if one is present.

3.1.4.7.1.2 Reserved

3.1.4.7.1.3 Feature Name

ReqID-13534   Feature Improvement SHALL capture ***Feature name*** from GIS source, when available, and according to the production thread.

ReqID-14735   The field SHALL be empty when not available in the source.

3.1.4.7.1.4 Geographic Entity Type

RT-G defines types of geographic entities. Additional information provided by the Census Bureau the time of production tasking identifies which local entities should be used MTAIP processing. Entities identified in the Census Bureau tasking will be returned in the Northbound data. The ***Geographic entity type*** characteristic captures the type of entity being identified.

ReqID-8993   Feature Improvement SHALL match the ***Geographic entity type*** characteristic from GIS source, when available, identifying the type of geographic entity.

ReqID-14738   The value of ***Geographic entity type*** SHALL be as identified in 3.1.1.6.3.

3.1.4.7.1.5 Cadastral boundary

This characteristic applies to GIS cadastral boundaries, and identifies the type of real estate or land record boundary.

ReqID-8996   Feature Improvement SHALL capture the ***Cadastral boundary*** characteristic from GIS source, when available.

ReqID-14739   The ***Cadastral boundary*** characteristic SHALL be encoded as follows:

         P = Cadastral Boundary, Parcel line type

         V = Cadastral Boundary, Public Land Survey System line type

         R = Cadastral Boundary, Other real property line type

         U = Cadastral Boundary of unknown type

ReqID-15563   The field SHALL be empty if the non-visible feature is not a cadastral boundary.

ReqID-14740   The field(s) SHALL be empty when not available in the source.

3.1.4.7.1.6 Special Feature Class

ReqID-14741   The field SHALL be empty (pending further definition).

3.1.4.7.2 Boundary Processing

Those TIGER boundaries that need to be preserved positionally and topologically during MTAIP processing are called "fidelity boundaries". Fidelity boundaries are identified in Southbound TIGER data via the ***Boundary Fidelity Maintenance Flag (BFMF)*** in **RT-1** and **RT-G**. The term "Shape Fidelity" refers to the retaining of the shape, cardinal direction, and topological relationship of a boundary.

Feature Improvement will give priority to maintaining the shape, cardinal direction, and topological relationship of fidelity boundaries. Maintaining the shape fidelity of an overall boundary is a higher priority than maintaining the shape fidelity of an individual boundary segment (e.g., when the shape of the boundary is a perfect square, every attempt will be made to retain that shape). The exception to the previous sentence is that the shape fidelity of a matched visible feature that is also a fidelity boundary will take precedence over the shape fidelity of the overall boundary.

ReqID-13547   Boundary processing SHALL be accomplished in accordance with the MTAIP Boundary Fidelity Guidelines in Volume II.

ReqID-13483   Feature Improvement SHALL process "fidelity boundaries" identified by the Southbound **RT-1 *Boundary Fidelity Maintenance Flag (BFMF)***.

Order of precedence

ReqID-13485   Feature Improvement SHALL give precedence to maintaining TIGER topology over maintaining "shape fidelity".

ReqID-13486   Feature Improvement SHALL give precedence to maintaining matches with named roads (matching TIGER data to source data) over maintaining "shape fidelity".

ReqID-13488   Feature Improvement SHALL give precedence to "shape fidelity" over matching TIGER to unnamed roads.

Shape fidelity of an overall boundary vs. an individual segment

ReqID-14308   Feature Improvement SHALL give precedence to maintaining the shape fidelity of a matched visible feature that is a "fidelity boundary" segment over maintaining the shape fidelity of an overall boundary.

ReqID-14309   Feature Improvement SHALL give precedence to maintaining the shape fidelity of an overall boundary over maintaining the shape fidelity of a visible (but unmatched) individual boundary segment.

ReqID-14310   Feature Improvement SHALL give precedence to maintaining the shape fidelity of an overall boundary over maintaining the shape fidelity of an individual non-visible boundary segment.

Boundaries and Roads

ReqID-13487   When a named road is coincident with a boundary in both TIGER and the source file, Feature Improvement SHALL jointly adjust the boundary and the road, as necessary to match TIGER to the source.

ReqID-14312   When a matched, named road is not coincident with a boundary, Feature Improvement SHALL retain the relationship between the road and the boundary even if that means changing the boundary shape. (For example, a matched, named road outside or inside of a boundary will remain outside or inside the boundary after feature adjustment.)

Boundaries Internal to a County

ReqID-14314   For boundaries internal to a county, Feature Improvement SHALL align TIGER boundaries to source boundaries when there is a match.

ReqID-14315   Feature Improvement SHALL not add any new internal boundaries to the TIGER line network.

County Partition Boundaries

ReqID-14316   When aligning a county partition boundary, Feature Improvement SHALL perform the following:

> Align TIGER features along the county partition boundary to match the boundary features in the source.

> Detach and move features that intersect the TIGER county partition boundary where necessary to align the feature to a matching feature in the source.

> Preserve "line of sight" when detaching a feature from a county boundary (i.e., do not preclude the ability of the Census Bureau to add a non-visible line to close the polygon during the upload process).

Setting the Shape Fidelity Flag

ReqID-9012   Feature Improvement SHALL evaluate the "after alignment" *shape fidelity* of every 1-cell identified as a *fidelity boundary* in the SB RT-1.

ReqID-16030   The Shape Fidelity Flag SHALL be set to a value of "P", indicating that shape fidelity was not maintained, when ALL of the following conditions exist:

Condition 1: The line is a fidelity boundary

Condition 2: *Match Status*; meeting 2A OR 2B below:

    2A: The line is a F class feature with a *Match Status* value of X

    2B: The line is a visible (i.e., physical) feature with a *Match Status* value of X or N

Condition 3: Positional or angular movement; meeting 3A OR 3B below, when comparing the original position of the line in the SB TIGER file to the position of the line after alignment:

    3A: The cardinal direction of the line has been altered by 15 degrees or greater

    3B: The cardinal direction of the line has been altered by 4 to 15 degrees AND one of the end points of the line has moved by 40 meters or greater

3.1.4.8 Physical Features

Physical Features are ridgelines, fence lines, dams, or any feature visible on the landscape (not transportation, structure, or hydrography).

ReqID-14744   Feature Improvement SHALL process physical features in accordance with the source and processing requirements of the subject county production thread (ref. 3.1.3.4), as well as the general feature matching requirements of 3.1.4.1.1, and specific physical feature requirements immediately below.

ReqID-8966   Areal representations of dams in the source file SHALL be converted to single line representations for improved TIGER files.

ReqID-8965   When a physical feature is marked as matched, Feature Improvement SHALL assign a CFCC of "E" to the feature.

ReqID-14745   If the source does not specify a physical feature as one of the special feature classes identified in 3.1.4.8.1.4, the feature SHALL be omitted from the Northbound files.

3.1.4.8.1 Attributes and Characteristics Applicable to Physical Features

ReqID-14746 Attributes and characteristics of source features SHALL be captured in accordance with the general attribute capture requirements of 3.1.4.1.2.

3.1.4.8.1.1 Non-Census ID

ReqID-12677 Feature Improvement SHALL capture the *Non-Census ID* of all matched (captured) features when Non-Census IDs are present in a TSC&L GIS file.

ReqID-14747 When the source is a TSC&L GIS file, the *Non-Census ID* SHALL be the local ID in the TSC&L GIS file. When the TSC&L GIS file does not identify a field as the local ID, the *Non-census ID* should be a unique identifier of the feature in the source, if one is present.

3.1.4.8.1.2 Reserved

3.1.4.8.1.3 Feature Name

ReqID-13538 Feature Improvement SHALL capture *Feature name* from GIS source, when available, according to the processing thread.

ReqID-14749 The field SHALL be empty when not available in the source.

3.1.4.8.1.4 Special Feature Class

This characteristic indicates the type of physical feature (geographic or man-made) represented by the TIGER or source file.

ReqID-8975 Feature Improvement SHALL capture the *Special feature class* characteristic from GIS source, when available, indicating the type of physical feature.

ReqID-14750 The *Special feature class* characteristic SHALL be encoded as follows:

> D = Dam
>
> L = Levee
>
> R = Ridgeline
>
> F = Fence line
>
> S = Edge of Swamp

3.1.4.9 Pedestrian Way Features

Pedestrian ways are special transportation features for use by non-motorized traffic. The feature class includes walking trails, bike paths, bridle paths, and stepped trails. These walkways are considered addressable trails.

ReqID-14751 Feature Improvement SHALL process pedestrian way features in accordance with the source and processing requirements of the subject county production thread (ref. 3.1.3.4), as well as the general matching and alignment requirements of 3.1.4.1.1.

ReqID-9015 When a pedestrian way feature is marked as matched, Feature Improvement SHALL assign a CFCC of "W" to the feature.

ReqID-14752 If the source does not specify a pedestrian way feature as one of the special feature classes identified in 3.1.4.9.1.11, the feature SHALL be omitted from the Northbound files.

3.1.4.9.1 Attributes and Characteristics Applicable to Pedestrian Ways

ReqID-14753   Attributes and characteristics of source features SHALL be captured in accordance with the general attribute capture requirements of 3.1.4.1.2.

3.1.4.9.1.1 Non-Census ID

ReqID-12681   Feature Improvement SHALL capture the **Non-Census ID** of all matched (captured) features when Non-Census IDs are present in a TSC&L GIS file.

ReqID-14754   When the source is a TSC&L GIS file, the **Non-Census ID** SHALL be the local ID in the TSC&L GIS file. When the TSC&L GIS file does not identify a field as the local ID, the **Non-census ID** should be a unique identifier of the feature in the source, if one is present.

3.1.4.9.1.2 Reserved

3.1.4.9.1.3 Feature Name

ReqID-13542   Feature Improvement SHALL capture **Feature name** from GIS source, when available, and according to the processing thread.

ReqID-14756   The field SHALL be empty when not available in the source.

3.1.4.9.1.4 Address Range

ReqID-14758   GIS source SHALL be used to capture **Address range**, when available in the source, and according to the processing thread.

ReqID-14759   **Left FROM address** SHALL be captured, when available.

ReqID-14760   **Left TO address** SHALL be captured, when available.

ReqID-14761   **Right FROM address** SHALL be captured, when available.

ReqID-14762   **Right TO address** SHALL be captured, when available.

ReqID-14763   The field(s) SHALL be empty when not available in the source.

3.1.4.9.1.5 Zip Codes

ReqID-14765   GIS source SHALL be used to capture **Zip code**, when available in the source, and according to the production thread.

ReqID-14766   **Left side zip code** SHALL be captured, when available.

ReqID-14767   **Right side zip code** SHALL be captured, when available.

ReqID-14768   The field(s) SHALL be empty when not available in the source.

3.1.4.9.1.6 FROM Stack

Stack levels are separations of the surface levels of pedestrian ways overlapping or under lapping with other features.

ReqID-12809   Feature Improvement SHALL capture the **FROM Stack** attribute from GIS source, when available, and according to the production thread, indicating the relative levels of coincident pedestrian ways and other features.

ReqID-12811   The range and definition of values of the pedestrian way feature **FROM Stack** field SHALL be the same as those for the road feature **FROM Stack** field, as defined in 3.1.4.2.1.6.

ReqID-14769   The field SHALL be empty when not available in the source.

3.1.4.9.1.7 TO Stack

ReqID-12819 Feature Improvement SHALL capture the **TO Stack** attribute from GIS source, when available, and according to the production thread, indicating the relative levels of coincident pedestrian ways features and other features.

ReqID-12821 The range and definition of values of the pedestrian way feature **TO Stack** field SHALL be the same as those for the road feature **TO Stack** field, as defined in 3.1.4.2.1.7.

ReqID-14770 The field SHALL be empty when not available in the source.

3.1.4.9.1.8 Median Width

ReqID-9036 Feature Improvement SHALL capture the **Median width** attribute from GIS source, when available, and according to the production thread.

ReqID-9038 The **Median width** attribute SHALL be captured when a double line feature is represented in the TIGER data and the GIS source is represented as a single line feature.

ReqID-9039 **Median width** SHALL be stated in meters, rounded to the nearest whole number.

ReqID-14771 A value of -1 SHALL indicate that there is no median.

ReqID-14772 The field SHALL be empty when not available in the source.

3.1.4.9.1.9 Feature Width

ReqID-9042 Feature Improvement SHALL capture the **Feature width** attribute from GIS source, when available, and according to the production thread.

ReqID-9041 The **Feature width** attribute SHALL be stated in meters, rounded to the nearest whole number.

ReqID-14773 The field SHALL be empty when not available in the source.

3.1.4.9.1.10 Special Segment Type

The special segment type characteristic indicates the type of special segment represented by the feature.

ReqID-13105 Feature Improvement SHALL capture the **Special segment type** characteristic from GIS source, when available, and according to the production thread.

ReqID-14774 The end points of the TIGER feature SHALL be adjusted and/or split, as necessary to match the spatial aspects of the special segment type.

ReqID-14775 The **Special segment type** characteristic SHALL be encoded as follows:

> B = Bridge
>
> D = Dam
>
> L = Levee
>
> T = Tunnel

ReqID-15564 The field SHALL be empty when not available in the source.

3.1.4.9.1.11 Special Feature Class

ReqID-12350 Feature Improvement SHALL capture the **Special feature class** characteristic from GIS source, when available, and according to the production thread, indicating the class of pedestrian way.

ReqID-14776 The **Special feature class** characteristic SHALL be encoded as follows:

> B = Bike Path
>
> H = Bridle Trail
>
> S = Stairway
>
> W = Walking Trail
>
> M = Mixed Use

3.1.5 Improved TIGER Data Output - Northbound Format

3.1.5.1 Improved TIGER Files

As with the incoming (Southbound) TIGER data (ref. 3.1.1) improved TIGER data is returned in county partitions.

ReqID-8327   Improved TIGER data output SHALL be output for delivery to the Census Bureau as specified in 3.1.5.1.1.1.

ReqID-8326   Improved TIGER data output SHALL contain feature and attribute data (as specified herein) to convey improved accuracy and improved attribution.

ReqID-9316   Improved TIGER data output SHALL omit attribute data that was provided by the Census Bureau in the original Southbound TIGER files.

ReqID-8330   Improved TIGER data output SHALL be provided to the Census Bureau in coordinate files and companion attribute tables.

ReqID-8331   Improved TIGER data output SHALL be delivered in an exchange format consisting of interrelated sub files, each containing multiple data records, defined below.

3.1.5.1.1 General

3.1.5.1.1.1 Improved TIGER Data Formats

The underlying concept behind the format of the improved TIGER data is based on transferring the spatial information in one type of file and attribute information in a companion file type. The principal objects of TIGER are lines, point features, area features, and geographic entities. Separate spatial and attribute files will be used for each of the four object types. These files are defined in 3.1.5.1.4 through 3.1.5.1.7.

3.1.5.1.1.1.1 File Organization

Improved TIGER data output files are organized by record type. Spatial and attribute data are organized according to their object type and data type; where all records of a given object type/data type are exclusively contained within a single sub file, which is referred to by the record type contained therein. Improved TIGER data consists of 9 record types; hence there are 9 sub files that collectively make up the improved files for the county (or county equivalent).

ReqID-8339   Improved TIGER data output SHALL partition output data by county (or county equivalent).

ReqID-8340   Improved TIGER data output SHALL consist of 9 sub files, organized by object type and data type.

ReqID-8341   Improved TIGER data output SHALL contain only one sub file of each object type/data type, hereinafter referred to as the record type.

ReqID-8342   Improved TIGER data output sub files SHALL include multiple data records, every record within a file having the same record type, as defined in 3.1.5.1.2 through 3.1.5.1.8.

ReqID-8343   Improved TIGER data output SHALL present a topologically consistent network across the county.

3.1.5.1.1.1.2 File Naming Convention

The improved files for each county (or county equivalent) are identified by state and county FIPS code. Each sub file name includes a file suffix that indicates the record type of that sub file.

ReqID-8346   Improved TIGER data output SHALL utilize the following common naming convention:

ReqID-8347   The first three characters SHALL be the letters "AIP", indicating that the file contains *Accuracy Improvement Project* data.

ReqID-8348   The fourth and fifth characters within the TIGER filename SHALL be the numeric two-digit state FIPS code.

ReqID-8349   The sixth, seventh, and eighth characters within the TIGER filename SHALL be the numeric three-digit county FIPS code.

ReqID-8350   The file extension SHALL identify the Record type using the extension ".NB*X*", where "*X*" is the record type of the file.

Two example file names are shown below:

AIP11001.NB1 = Improved MTAIP data for the District of Columbia (11001), with a Spatial File for Linear Features (Northbound type 1).

AIP72047.NB7 = Improved MTAIP data for Corozal (047), Puerto Rico (72), with an Areal Feature Attribute File (Northbound type 7).

ReqID-14345   File names and file extensions SHALL be expressed in UPPER CASE ONLY.

ReqID-14346   File names and file extensions SHALL no contain any blank_characters.

Table 3.1.5.1-1 Northbound Improved TIGER Data Types

Northbound Type	Name	Function
NB-1	Spatial File for Linear Features	Defines coordinates for linear features
NB-2	Spatial File for Geographic Entities	Defines coordinates for geographic entities
NB-3	Spatial File for Areal Features	Defines coordinates for areal features
NB-4	Spatial File for Point Features	Defines coordinates for point features
NB-5	Linear Feature Spatial Table	Provides supplemental spatial information for linear features
NB-6	Linear Feature Attribute Table	Provides attributes for linear features
NB-7	Geographic Entity Attribute Table	Provides attributes for geographic entities
NB-8	Areal Feature Attribute Table	Provides attributes for areal features
NB-9	Point Feature Attribute Table	Provides attributes for point features
NB-A	Zero Cell Matching Record	Matches 0-cells for subject and adjacent counties
NB-B	One Cell Matching Record	Matches 1-cells for subject and adjacent counties
NB-C	Structure/Address Harvesting File	Provides structure and address data harvested from GIS files
NB-M	Metadata Record	Provides actions, means, and quality values for Northbound data

3.1.5.1.1.1.3 Record Keys

ReqID-8353   Improved TIGER data output SHALL identify each geographic object by a Harris Feature ID (HID).

ReqID-8356   Improved TIGER data output SHALL assign HIDs with an integer value between 1 to 3,999,999,999.

ReqID-13466   Every HID SHALL be unique across all objects in a county.

ReqID-8354   The HID for an object in a spatial file SHALL be the same as the HID for that object in the associated attribute file, allowing the mapping of objects between spatial files and attribute files.

ReqID-8355   Metadata SHALL use HIDs to refer to objects in spatial files and attribute files.

3.1.5.1.1.1.4 MTAIP Geographic Coordinate Standards

ReqID-13359   Improved TIGER data output SHALL output geographic features based on North American Datum 1983 (NAD83).

Improved TIGER data output TIGER data with geographic coordinates (latitude and longitude).

ReqID-13361   Geographic coordinate units of measure SHALL be decimal degrees.

ReqID-13362   Latitude and longitude coordinates SHALL be carried to 7 (seven) decimal places (to the right of the decimal point).

ReqID-13363   Improved TIGER data output SHALL reference as the prime meridian the line of longitude that passes through Greenwich, England.

ReqID-13364   Latitude fields SHALL be formatted as defined in Table 3.1.5.1-2.

Table 3.1.5.1-2 Northbound TIGER Latitude Field Layout

Field length is 11 (eleven) characters		
Character 1	Value = "+" or "–"	"+" indicates the Northern Hemisphere "-" indicates the Southern Hemisphere
Characters 2-3	Degrees of latitude	Leading zeros is required for degrees less than 10.
Character 4	Decimal point is explicit	
Characters 5-11	Decimal degrees	Trailing zero(s) is required.

ReqID-13367   Longitude fields SHALL be formatted as defined in Table 3.1.5.1-3.

Table 3.1.5.1-3 Northbound TIGER Longitude Field Layout

Field length is 12 (twelve) characters		
Character 1	Value = "+" or "–"	"+" indicates the Eastern Hemisphere "-" indicates the Western Hemisphere
Characters 2-4	Degrees of longitude	Leading zero(s) is required for degrees less than 100.
Character 5	Decimal point is explicit	
Characters 6-12	Decimal degrees	Trailing zero(s) is required.

3.1.5.1.1.2 Record Layout Table Convention

A record layout table provides the contents and layout of data element within a data record. The terminology of the table headings is described below.

Field Name. Identifies the name of the data element, as used within this document

Field Identifier. Identifies the field identifier or abbreviated name of the data element

BV (Blank Value). Identifies if a data element is optional

Value of *Yes* means the data element can be blank

Value of *No* means the data element is required

Data Type. Identifies data type of the field

Value of A means the data is alphanumeric

Value of N means the data is numeric

Quote. Identifies if a data element must be enclosed in quotes

Value of Yes means that the data element must be enclosed in quotes

Blank value means that quotes are not required

3.1.5.1.2 Spatial Files

The spatial files consist of the spatial components of TIGER objects. The format for the spatial data is the same for all object classes (Lines, Geographic Entities, Area Features and Point Features).

3.1.5.1.2.1 Purpose

The spatial files describe the spatial objects in the improved TIGER data.

ReqID-9318   Improved TIGER data output SHALL output four spatial files containing all of the spatial information returned for a county (or county equivalent).

ReqID-9319   Improved TIGER data output SHALL output one spatial file consisting of all linear features.

ReqID-9320   Improved TIGER data output SHALL output one spatial file consisting of all geographic entities.

ReqID-9321   Improved TIGER data output SHALL output one spatial file consisting of all areal features.

ReqID-9322   Improved TIGER data output SHALL output one spatial file consisting of all point features.

3.1.5.1.2.2 Format

ReqID-8403   Improved TIGER data output SHALL output spatial files in a flat file format, with an ISO 8859-1 character set.

ReqID-9323   Improved TIGER data output SHALL define each spatial object in a record consisting of:

a Harris ID

a pair of longitude and latitude coordinates (separated by a blank character)

"END" (denoting the end of the record)

ReqID-9327   The long/lat coordinate pairs SHALL be repeated as necessary to completely define the spatial object, as described below.

ReqID-16057   Each line within a record SHALL be delimited by a <NL> (New Line: ISO 8859-1 decimal value 10).

ReqID-9328   The length of each record SHALL be determined by the number of coordinate points therein.

ReqID-16058   Each record SHALL be delimited by a <NL> (New Line: ISO 8859-1 decimal value 10).

ReqID-8408   The end of the file SHALL be denoted with an additional "END" as the final record within the file.

3.1.5.1.2.3 Data Elements and File Format

ReqID-2804   Improved TIGER data output SHALL represent the data elements and file/record format in the same manner for all spatial files, varying only in the number of longitude and latitude elements.

ReqID-2801   Improved TIGER data output SHALL assign a unique Harris feature ID (HID) for every spatial object within a spatial file. (HID numbers cannot be duplicated in other spatial files.)

3.1.5.1.2.3.1 Spatial File for Linear Features

ReqID-2805   Improved TIGER data output SHALL output spatial data for all linear features in a county (or county equivalent) in a single spatial file.

ReqID-2814   The **Spatial File for Linear Features** SHALL contain a record for every line represented in the county, consisting of all new lines, all adjusted lines, as well as all lines that did not require adjustment.

ReqID-2815   The **Spatial File for Linear Features** SHALL omit features that were deleted during MTAIP processing.

ReqID-2806   Linear feature records SHALL consist of the unique HID, two or more coordinates (each comprised of a pair of long and lat elements), and an "END" element to signify the end of the record.

ReqID-2807   A straight line SHALL be represented by two coordinates, representing the start node and the end node.

ReqID-2809   A curved line SHALL be represented by more than two coordinates, representing the start node, one or more shape points, and the end node.

ReqID-2810   Improved TIGER data output SHALL output line record coordinates in the following order:

ReqID-2811   The first coordinate SHALL be the start node.

ReqID-2812   The last coordinate SHALL be the end node.

ReqID-2813   All coordinates between the start node and the end node SHALL be shape points.

ReqID-13467   Shape points SHALL be listed sequentially in order from the start node to the end node.

3.1.5.1.2.3.2 Spatial File for Geographic Entities

A geographic entity is an area feature composed of one or more polygons. The **Spatial File for Geographic Entities** defines the spatial extent of geographic entities. When an entity is composed of multiple polygons, the polygons could exist as separate areas or areas sharing a common point. Multiple polygons could also represent one polygon defining the entity boundary, with a second polygon inside the first (where the second polygon defines the boundary of an interior region that is not part of the geographic entity).

ReqID-2818   The **Spatial File for Geographic Entities** SHALL contain a record for all geographic entities that have been requested by the Census Bureau in written instructions accompanying a TSC&L GIS file delivered as Government Furnished Information.

ReqID-2819   The **Spatial File for Geographic Entities** SHALL omit entities that were not requested by the Census Bureau.

ReqID-2820   Geographic entity records SHALL consist of the unique HID, a number of coordinates (each comprised of a pair of long and lat elements) defining the boundary polygon(s), and an "END" element to signify the end of the record.

ReqID-11990   When an entity is comprised of multiple polygons, Improved TIGER data output SHALL assign the coordinates for all of the polygons to a single geographic entities record.

ReqID-2821   The coordinates defining a geographic entity SHALL be listed sequentially around the polygon(s).

ReqID-2826   The last coordinate of each boundary polygon SHALL be identical to the starting coordinate.

3.1.5.1.2.3.3 Spatial File for Areal Features

The **Spatial File for Areal Features** defines the spatial extent of area landmarks and area hydro features. An areal feature is composed of one or more polygons. When an areal feature is composed of multiple polygons, the polygons could exist as separate areas or areas sharing a common point. Multiple polygons could also represent one polygon defining the area boundary, with a second polygon inside the first (where the second polygon defines the boundary of an interior region that is not part of the areal feature).

ReqID-2830   The **Spatial File for Areal Features** SHALL contain a record for each areal feature provided in the source data, except as excluded by the three requirements immediately below:

Note: Identifying feature types and determining attribute values requires the evaluation of all aspects of the source data. This includes, but is not limited to, source file content, source file name, and associated metadata.

ReqID-14393   Any area feature SHALL be excluded from the **Spatial File for Areal Features** if the source does not allow the identification of the feature as either a hydro feature or a landmark feature.

ReqID-14391   An area hydro feature (CFCC of H) SHALL be excluded from the **Spatial File for Areal Features** if the source does not allow the determination of the value of the feature's *Area hydro feature class* attribute (ref. 3.1.4.4.1.14).

This means that when the source provides no information regarding the type of area hydro feature, the record for that feature is not returned in the file.

Note that when the source identifies that an area hydro feature is NOT one of the 3.1.4.4.1.14 special class features, the feature receives an *Area hydro feature class* value of blank, not empty, and is thus included in the file.

ReqID-14392   An area landmark feature (CFCC of K) SHALL be excluded from the **Spatial File for Areal Features** if the source does not allow the identification of the areal feature as one or more of the following feature classes:

> City hall (ref. 3.1.4.6.1.4)
> Police station (ref. 3.1.4.6.1.5)
> Fire department (ref. 3.1.4.6.1.6)
> Library (ref. 3.1.4.6.1.7)

Transportation feature class (ref. 3.1.4.6.1.8)
Government/Institutional feature class (ref. 3.1.4.6.1.9)
Commercial/Other feature class (ref. 3.1.4.6.1.10)

This means that when the source provides no information with regard to the type of area landmark feature, the record for that feature is not returned in the file. Landmark features DO NOT make allowance for the source defining an "other" type of area landmark (as provided for area hydro features).

ReqID-15998   If an areal feature is contained in multiple source files, the spatial record SHALL be chosen from the source carrying the higher CQV (as described in 3.1.3.7).

ReqID-2832   Areal feature records SHALL consist of the unique HID, a number of coordinates (each comprised of a pair of long and lat elements) defining the area polygon(s), and an "END" element to signify the end of the record.

ReqID-11994   When an area is comprised of multiple polygons, the coordinates for all of the polygons SHALL be contained in a single areal feature record.

ReqID-2833   The coordinates defining an areal feature SHALL be listed sequentially around the polygon(s).

ReqID-2834   The last coordinate of each area polygon SHALL be identical to its starting coordinate.

3.1.5.1.2.3.4 Spatial File for Point Features

The **Spatial File for Point Features** defines points for point landmarks, point hydro features, and a special class of road features.

ReqID-2848   The **Spatial File for Point Features** SHALL contain a record for each point feature provided in the source data, except as excluded by the four requirements immediately below:

Note: Identifying feature types and determining attribute values requires the evaluation of all aspects of the source data. This includes, but is not limited to, source file content, source file name, and associated metadata.

ReqID-14432   Any point feature SHALL be excluded from the **Spatial File for Point Features** if the source does not-allow the identification of the feature as a road feature, a hydro feature, or a landmark feature.

ReqID-14431   A point road feature (CFCC of A) SHALL be excluded from the **Spatial File for Point Features** if the source does not allow the determination of the value of the ***Barrier to automobile traffic*** attribute.

ReqID-14429   A point hydro feature (CFCC of H) SHALL be excluded from the **Spatial File for Point Features** if the source does not allow the determination of the value of the feature's ***Point hydro feature class*** attribute (ref. 3.1.4.4.1.13).

This means that when the source provides no information regarding the type of point hydro feature, the record for that feature is not returned in the file.

Note that when the source identifies that a point hydro feature is NOT one of the 3.1.4.4.1.13 special class features, the feature receives a ***Point hydro feature class*** value of blank, not empty, and is thus included in the file.

ReqID-14430   A point landmark feature (CFCC of L) SHALL be excluded from the **Spatial File for Point Features** if the source does not-allow the identification of the point feature as one or more of the following feature classes:
City hall (ref. 3.1.4.6.1.4)
Police station (ref. 3.1.4.6.1.5)

Fire department (ref. 3.1.4.6.1.6)
Library (ref. 3.1.4.6.1.7)
Transportation feature class (ref. 3.1.4.6.1.8)
Government/Institutional feature class (ref. 3.1.4.6.1.9)
Commercial/Other feature class (ref. 3.1.4.6.1.10)

This means that when the source provides no information with regard to the type of point landmark feature, the record for that feature is not returned in the file. Landmark features DO NOT make allowance for the source defining an "other" type of point landmark (as provided for point hydro features).

ReqID-16002   If a point feature is contained in multiple source files, the spatial record SHALL be chosen from the source carrying the higher CQV (as described in 3.1.3.7).

ReqID-2841   Point feature records SHALL consist of the unique HID, a single coordinate (comprised of a pair of long and lat elements), and an END element to signify the end of the record.

3.1.5.1.3 Linear Feature Spatial Table

The **Linear Feature Spatial Table** consists of specific spatial attributes for new and improved lines (1-cells) in the TIGER data. All lines that were contained in the **Spatial File for Linear Features** will be referenced in this file.

3.1.5.1.3.1 Purpose

ReqID-10725   The **Linear Feature Spatial Table** SHALL describe spatial attributes for 1-cells in the improved TIGER data.

ReqID-10726   Improved TIGER data output SHALL output spatial data for all line objects in a county (or county equivalent) in a single **Linear Feature Spatial Table**.

ReqID-10727   The Linear Feature Spatial Table SHALL contain a record for every line contained in the Spatial File for Linear Features.

Linear features that were deleted during processing are not returned in the **Linear Feature Spatial Table**.

3.1.5.1.3.2 Format

ReqID-10730   Improved TIGER data output SHALL output the **Linear Feature Spatial Table** file in a flat file format, with an ISO 8859-1 character set.

ReqID-10731   The **Linear Feature Spatial Table** SHALL contain multiple **Linear Feature Spatial** records, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-10732   The **Linear Feature Spatial Table** record length SHALL be variable.

ReqID-10733   Each field within a **Linear Feature Spatial Table** record SHALL be delimited by a comma. (A field that is empty - meaning no data returned - is represented as ,, (comma comma with no space in between).

ReqID-10735   The Record Layout for the **Linear Feature Spatial Table** SHALL be as defined in Table 3.1.5.1.3.

Table 3.1.5.1.3 Record Layout for Linear Feature Spatial Table

Description	Field	EV	Type	Double Quotes
Harris ID	HID	No	N	
Key to Spatial MID	SMID_Key	Yes	N	

Description	Field	EV	Type	Double Quotes
Hydrography Fill	WATERSIDE	No	A	
TIGER line ID	TLID	No	N	
Match status	MATCH_STATUS	No	A	
Line delete flag	DEL_FLAG	Yes	A	
Shape fidelity flag	FID_FLAG	Yes	A	
Census feature class	CFCC	No	A	

3.1.5.1.3.3 Data Element Dictionary

ReqID-10770   The *Harris ID* field SHALL be the reference to the HID field in the **Spatial File for Linear Features.**

ReqID-10771   The *Key to Spatial MID* SHALL be the *Record key* of the **Metadata** means record providing the basis for the spatial data in this record.

ReqID-10772   The *Key to Spatial MID* field SHALL be empty for linear features that are not matched to source or have been proportionally adjusted (having a *Match status* value of N or X).

Edge Matching Conditions

ReqID-16093   The Key to Spatial MID SHALL be the spatial means of the adjacent county TIGER 1-cell when, during edge matching, the linear feature was matched to the adjacent county TIGER data (ref. 3.1.3.5).

ReqID-16094   The Key to Spatial MID SHALL be the *spatial means of the* subject county source when, during edge matching, the linear feature was matched to the subject county source *data* (ref. 3.1.3.5).

ReqID-10773   The *Hydrography Fill* field SHALL identify if either side or both sides of the 1-cell have hydro fill.

ReqID-12406   The *Hydrography Fill* field SHALL be encoded using the following values:

   L = Hydro fill is on the left side of the 1-cell (when oriented from the FROM node to the TO node)

   R = Hydro fill is on the right side of the 1-cell (as above)

   N = Hydro fill is on neither side of the 1-cell

   B = Hydro fill is on both sides of the 1-cell

ReqID-10778   The *TIGER line ID* field SHALL identify the 1-cell TLID provided by the Census Bureau in the Southbound **RT-1**.

ReqID-12408   Multiple HID lines created from the same TLID SHALL each reference the original TLID.

   Multiple HID lines from the same TLID are contiguous.

ReqID-10780   All new lines (not present in the original Southbound file, but added during this improvement process) SHALL carry a value of 0 (zero) in the *TLID* field.

ReqID-10781   The *Match status* field SHALL indicate the relationship between the HID and the source material using the following values:

   M = A match was made between the HID and the source material.

N = No match was made between the HID and the source material; i.e., the HID was interpolated or rubbersheeted.

X = The field is not applicable, because the line or the line type was not contained in the source material. The HID was interpolated or proportionally adjusted.

ReqID-14322   The *Line delete flag* field SHALL indicate HIDs whose features need to be deleted from TIGER, as identified in 3.1.4.1.1.2.3.

C = HID was converted from one CFC to another, hence the original feature was deleted.

M = The line feature on this HID must be deleted. Harris is confident the feature does not exist in its current location and keeping it there has a detrimental effect on the line network of this feature type.

ReqID-14325   This field SHALL be empty when the linear feature does not need to be deleted from TIGER.

The *Shape fidelity flag* indicates if shape fidelity was not maintained according to the criteria of 3.1.4.7.2.

ReqID-14327   The *Shape fidelity flag* field SHALL indicate an inability to maintain *Shape Fidelity* as indicated below:

P = TIGER shape fidelity could not be preserved, according to the criteria defined in 3.1.4.7.2 (ReqID-16030).

ReqID-14329   This field SHALL be empty when there is no shape fidelity problem, either because shape fidelity was maintained during alignment, or because the feature is not a fidelity boundary.

ReqID-14330   The Census feature class SHALL be the feature class code, as captured and encoded per the requirements of the feature class:

Road features per 3.1.4.2

Rail features per 3.1.4.3

Hydro features per 3.1.4.4

Miscellaneous transportation features per 3.1.4.5

Non-visible features per 3.1.4.7

Physical features per 3.1.4.8

Pedestrian way features per 3.1.4.9

3.1.5.1.4 Linear Feature Attribute Table

The **Linear Feature Attribute Table** consists of feature attributes and characteristics for new and improved lines (1-cells) in the TIGER data. Linear features that were contained in the **Spatial File for Linear Features** can be referenced in this file.

ReqID-14362   Attributes and characteristics returned in the **Linear Feature Attribute Table** SHALL meet the general attribute capture requirements of 3.1.4.1.2, including the Edge Matching Exception in 3.1.4.1.2.4.

3.1.5.1.4.1 Purpose

ReqID-10788 The **Linear Feature Attribute Table** SHALL describe feature attributes and characteristics for 1-cells in the improved TIGER data.

ReqID-10789 Improved TIGER data output SHALL output attribute and characteristic data for all linear features in a county (or county equivalent) in a single **Linear Feature Attribute Table**.

ReqID-10790 The **Linear Feature Attribute Table** file SHALL contain one or more records for a linear feature contained in the **Spatial File for Linear Features**, if (and only if) there are source attributes and characteristics to report for the feature.

Linear features that were deleted during processing are not returned in the **Linear Feature Attribute Table**.

3.1.5.1.4.1.1 Multiple Sources

When multiple sources have provided attributes for the linear feature, attributes for each source will be returned in a different record. Every attribute provided by a source will be contained in that source's record, regardless of whether the values for attributes for multiple sources are the same or different. The *Attribute means ID* identifies the source for the attributes in each record.

ReqID-14365 When a feature has attributes derived from multiple sources, one or more attribute records SHALL be returned for each source.

ReqID-14366 In the case of multiple sources (hence multiple records), each record SHALL contain attributes derived from one single source.

ReqID-14367 All attributes provided by a source SHALL be returned, regardless of whether the attribute values are the same or different from values from other sources.

3.1.5.1.4.1.2 Multiple Values for an Attribute

When a single source contains multiple values for the same attribute, additional records will be used to convey the additional data. Fields that do not have additional values should be empty in additional records.

ReqID-14370 When a single source has provided more than one value for an attribute, the additional values SHALL be returned in additional records.

ReqID-14371 Additional records SHALL omit all values that were included in a previous record for the same feature.

3.1.5.1.4.2 Format

ReqID-10794 Improved TIGER data output SHALL output the **Linear Feature Attribute Table** file in a flat file format, with an ISO 8859-1 character set.

ReqID-10795 The **Linear Feature Attribute Table** file SHALL contain multiple **Linear Feature Attribute** records, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-10796 The **Linear Feature Attribute Table** record length SHALL be variable.

ReqID-10797 Each field within a **Linear Feature Attribute Table** record SHALL be delimited by a comma.

ReqID-12069 Specific fields within a **Linear Feature Attribute Record** SHALL be enclosed in double quotes as indicated in Table 3.1.5.1.4.

ReqID-10799 The Record Layout SHALL be as defined in Table 3.1.5.1.4.

Table 3.1.5.1.4 Record Layout for Linear Feature Attribute Table

Description	Field	EV	Type	Double Quotes
Harris ID	HID	No	N	
Key to Attribute MID	AMID_KEY	No	A	
Source type	SOURCE	No	A	
Non-Census ID	NCID	Yes	A	Yes
Empty field	EMPTY	Yes		
Feature name	FENAME	Yes	A	Yes
Left FROM address	FRADDL	Yes	A	Yes
Left TO address	TOADDL	Yes	A	Yes
Left zip code	ZIPL	Yes	N	
Right FROM address	FRADDR	Yes	A	Yes
Right TO address	TOADDR	Yes	A	Yes
Right zip code	ZIPR	Yes	N	
FROM Stack	FR_STACK	Yes	N	
TO Stack	TO_STACK	Yes	N	
Median width	MEDIAN	Yes	N	
Feature width	WIDTH	Yes	N	
Special segment type	SPEC_SEG	Yes	A	
Special feature class	FE_CLASS	Yes	A	
Decked	DECKED	Yes	A	
Access to road	RD_ACES	Yes	A	
Traffic flow direction	RD_FLOW	Yes	A	
Federal highway code	RD_FHWY	Yes	A	Yes
Jurisdiction	RD_JURIS	Yes	A	
Toll road	RD_TOLL	Yes	A	
Number of lanes	RD_LANES	Yes	N	
Embedded rail	RD_EMBED	Yes	A	
Speed limit	RD_SPEED	Yes	N	
Road surface type	RD_SURF	Yes	A	
Traversable median	RD_TRAV	Yes	A	
Vehicular trail	RD_TRAIL	Yes	A	
Gauge	RR_GAUGE	Yes	A	
Condition of railroad grade	RR_COND	Yes	A	
Mass transit rail	RR_MASS	Yes	A	
Track function	RR_FUNCT	Yes	A	
Direction of water flow	HY_DIR	Yes	A	
Internal water line	HY_INT	Yes	A	
Shoreline	HY_SHORE	Yes	A	
USGS Closure line flag	HY_CLFLG	Yes	A	
Hydrographic category	HY_CAT	Yes	A	
NHD GNIS ID	GNIS_ID	Yes	N	
NHD Feature Code	FCODE	Yes	N	
NHD Reach Code	RCH_CODE	Yes	N	
NHD Reach Date	RCH_DATE	Yes	N	
Cadastral boundary type	NV_CBTYP	Yes	A	

3.1.5.1.4.3 Data Element Dictionary

ReqID-12461   Improved TIGER data output SHALL output **Linear Feature Attribute** data elements, as specified below:

ReqID-11069   The *Harris ID* SHALL be the 10 character HID in the **Spatial File for Linear Features** record identifying the spatial coordinates for the line object.

ReqID-12462   The *Key to Attribute MID* SHALL be the *Record key* of the **Metadata** means record providing the basis for the attributes and characteristics in this record.

ReqID-14372   The *Source type* attribute SHALL identify the type of source that provides the information for this record.

ReqID-14373   Values for *Source type* SHALL be as follows:

       D = Reserved (for Attributes from Southbound files that should be deleted)

       F = Attributes captured from field collection

       G = Attributes captured from GIS source

       H = Attributes captured from NHD source

       I = Attributes captured from imagery source

       R = Reserved (for Attributes returned from Southbound files)

ReqID-12463   The *Non-census ID* SHALL be the identifier used for the linear feature in the source data, as captured according to the requirements of the feature class:

       Road features per 3.1.4.2.1.1

       Rail features per 3.1.4.3.1.1

       Hydro features per 3.1.4.4.1.1

       Miscellaneous transportation features per 3.1.4.5.1.1

       Non-visible features per 3.1.4.7.1.1

       Physical features per 3.1.4.8.1.1

       Pedestrian way features per 3.1.4.9.1.1

ReqID-15969   The *Empty field* SHALL be devoid of data, as illustrated by ,, (comma comma with no space in between).

ReqID-12466   The *Feature name* SHALL be the name of the linear feature, as captured from the source, per the requirements of the feature class:

       Road features per 3.1.4.2.1.3

       Rail features per 3.1.4.3.1.3

       Hydro features per 3.1.4.4.1.3

       Miscellaneous transportation features per 3.1.4.5.1.3

       Non-visible features per 3.1.4.7.1.3

       Physical features per 3.1.4.8.1.3

       Pedestrian way features per 3.1.4.9.1.3

ReqID-12467   The **Left FROM address** SHALL be the FROM component of the left side address range, as captured and encoded per the requirements of the feature class:

   Road features per 3.1.4.2.1.4

   Pedestrian way features per 3.1.4.9.1.4

ReqID-12468   The **Left TO address** SHALL be the TO component of the left side address range, as captured and encoded per the requirements of the feature class:

   Road features per 3.1.4.2.1.4

   Pedestrian way features per 3.1.4.9.1.4

ReqID-12469   The **Left zip code** SHALL be the Zip Code for the left side of the line, as captured and encoded per the requirements of the feature class:

   Road features per 3.1.4.2.1.5

   Pedestrian way features per 3.1.4.9.1.5

ReqID-12470   The **Right FROM address** SHALL be the FROM component of the right side address range, as captured and encoded per the requirements of the feature class:

   Road features per 3.1.4.2.1.4

   Pedestrian way features per 3.1.4.9.1.4

ReqID-12471   The **Right TO address** SHALL be the TO component of the right side address range, as captured and encoded per the requirements of the feature class:

   Road features per 3.1.4.2.1.4

   Pedestrian way features per 3.1.4.9.1.4

ReqID-12472   The **Right zip code** SHALL be the Zip Code for the right side of the line, as captured and encoded per the requirements of the feature class:

   Road features per 3.1.4.2.1.5

   Pedestrian way features per 3.1.4.9.1.5

ReqID-12476   The **FROM Stack** attribute SHALL indicate feature level, as captured and encoded per the requirements for the feature class:

   Road features per 3.1.4.2.1.6

   Rail features per 3.1.4.3.1.4

   Hydro features per 3.1.4.4.1.4

   Miscellaneous transportation features per 3.1.4.5.1.4

   Pedestrian way features per 3.1.4.9.1.6

ReqID-12477   The **TO Stack** attribute SHALL indicate feature level, as captured and encoded per the requirements for the feature class:

   Road features per 3.1.4.2.1.7

   Rail features per 3.1.4.3.1.5

   Hydro features per 3.1.4.4.1.5

   Miscellaneous transportation features per 3.1.4.5.1.5

Pedestrian way features per 3.1.4.9.1.7

ReqID-12482   The *Median width* attribute SHALL indicate median width, as captured and encoded per the requirements for the feature class:

Road features per 3.1.4.2.1.8

Pedestrian way features per 3.1.4.9.1.8

ReqID-12494   The *Feature width* attribute SHALL indicate feature width, as captured and encoded per the requirements for the feature class:

Road features per 3.1.4.2.1.9

Hydro features per 3.1.4.4.1.6

Pedestrian way features per 3.1.4.9.1.9

ReqID-12485   The *Special segment type* characteristic SHALL indicate special segment type, as captured and encoded per the requirements for the feature class:

Road features per 3.1.4.2.1.10

Rail features per 3.1.4.3.1.6

Pedestrian way features per 3.1.4.9.1.10

ReqID-12515   The *Special feature class* characteristic SHALL indicate a special use class feature, as captured and encoded per the requirements for the feature class.

Road features per 3.1.4.2.1.21

Rail features per 3.1.4.3.1.9

Hydro features per 3.1.4.4.1.12

Miscellaneous transportation features per 3.1.4.5.1.6

Non-visible features per 3.1.4.7.1.6

Physical features per 3.1.4.8.1.4

Pedestrian way features per 3.1.4.9.1.11

ReqID-12497   The *Decked* characteristic SHALL indicate a multi-level road, rail, or road/rail combination, as captured and encoded per the requirements for the feature class:

Road and road/rail features per 3.1.4.2.1.11

Rail features per 3.1.4.3.1.7

ReqID-12488   The *Access to road* characteristic SHALL indicate the availability of traffic access to the road feature, as captured and encoded per the requirements for the feature class:

Road features per 3.1.4.2.1.13

ReqID-13512   The *Traffic flow direction* characteristic SHALL indicate the direction of traffic flow on the road feature, as captured and encoded per the requirements for the feature class:

Road features per 3.1.4.2.1.15

ReqID-13513   The *Federal highway code* characteristic SHALL indicate the Federal Highway code, as captured and encoded per the requirements for the feature class:

Road features per 3.1.4.2.1.16

ReqID-12503   The ***Jurisdiction*** characteristic SHALL identify the type of entity that maintains the road, as captured and encoded per the requirements for the feature class:

     Road features per 3.1.4.2.1.17

ReqID-12506   The ***Toll Road*** characteristic SHALL identify a road segment as a toll road, as captured and encoded per the requirements for the feature class:

     Road features per 3.1.4.2.1.18

ReqID-13514   The ***Number of lanes*** attribute SHALL indicate the number of lanes in the road segment, as captured and encoded per the requirements for the feature class:

     Road features per 3.1.4.2.1.19

ReqID-12518   The ***Embedded rail*** characteristic SHALL identify the presence of a rail line embedded in a road feature, as captured and encoded per the requirements for the feature class:

     Road features per 3.1.4.2.1.20

ReqID-12512   The ***Speed limit*** attribute SHALL provide the speed limit of the road feature, as captured and encoded per the requirements for the feature class:

     Road features per 3.1.4.2.1.22

ReqID-13515   The ***Road surface type*** characteristic SHALL identify the surface type of the road feature, as captured and encoded per the requirements for the feature class:

     Road features per 3.1.4.2.1.23

ReqID-12509   The ***Traversable median*** characteristic SHALL indicate that the roadway contains a median traversable by emergency vehicles, as captured and encoded per the requirements for the feature class:

     Road features per 3.1.4.2.1.24

ReqID-12521   The ***Vehicular trail*** characteristic SHALL indicate that the roadway is passable only by four-wheel drive vehicles, as captured and encoded per the requirements for the feature class:

     Road features per 3.1.4.2.1.25

ReqID-12527   The ***Gauge*** attribute SHALL indicate the rail gauge, as captured and encoded per the requirements for the feature class:

     Rail features per 3.1.4.3.1.8

ReqID-12524   The ***Condition of railroad grade*** characteristic SHALL indicate the condition of the track grade, as captured and encoded per the requirements for the feature class:

     Rail features per 3.1.4.3.1.10

ReqID-12548   The ***Mass Transit Rail*** characteristic SHALL indicate the type of rail track, as captured and encoded per the requirements for the feature class:

     Rail features per 3.1.4.3.1.11

ReqID-12545   The ***Track Function*** characteristic SHALL indicate the use of the rail tracks, as captured and encoded per the requirements for the feature class:

     Rail features per 3.1.4.3.1.12

ReqID-13521   The ***Direction of water flow*** attribute SHALL indicate the direction of the hydro feature flow, as captured and encoded per the requirements for the feature class:

        Hydro features per 3.1.4.4.1.7

ReqID-13522   The ***Internal water line*** characteristic SHALL represent an internal line in a double-line portrayed water feature, as captured and encoded per the requirements for the feature class:

        Hydro features per 3.1.4.4.1.8

ReqID-13524   The ***Shoreline*** characteristic SHALL indicate an edge of double line water, as captured and encoded per the requirements for the feature class:

        Hydro features per 3.1.4.4.1.9

ReqID-14379   The ***USGS Closure line flag*** SHALL indicate the presence of a USGS Closure line, as captured and encoded per the requirements for the feature class:

        Hydro features per 3.1.4.4.1.10

ReqID-14380   The ***Hydrographic category*** SHALL indicate the intermittent or perennial nature of a hydro feature, as captured and encoded per the requirements for the feature class:

        Hydro features per 3.1.4.4.1.11

ReqID-12536   The *NHD **GNIS ID*** characteristic SHALL be as captured and encoded from the NHD per 3.1.4.4.1.15

ReqID-12533   The ***NHD Feature Code*** characteristic SHALL be as captured and encoded from the NHD per 3.1.4.4.1.16

ReqID-12542   The ***NHD Reach Code*** characteristic SHALL be as captured and encoded from the NHD per 3.1.4.4.1.17

ReqID-12539   The ***NHD Reach Date*** characteristic SHALL be as captured and encoded from the NHD per 3.1.4.4.1.18

ReqID-12530   The ***Common Identifier*** characteristic SHALL be as captured and encoded from the NHD per 3.1.2.2.

ReqID-12578   The ***Cadastral boundary type*** characteristic SHALL indicate a cadastral non-visible feature, as captured and encoded per the requirements for the feature class:

        Non-visible features per 3.1.4.7.1.5

3.1.5.1.5 Geographic Entity Attribute Table

The **Geographic Entity Attribute Table** consists of feature attributes and characteristics for all geographic entities contained in the **Spatial File for Geographic Entities**.

3.1.5.1.5.1 Purpose

ReqID-14349   The **Geographic Entity Attribute Table** SHALL describe feature attributes and characteristics for geographic entities in the **Spatial File for Geographic Entities**.

ReqID-11083   Attribute and characteristic data for all geographic entities SHALL be contained in a single **Geographic Entity Attribute Table**.

ReqID-11084   The **Geographic Entity Attribute Table** SHALL contain one or more records for every entity contained in the **Spatial File for Geographic Entities**.

3.1.5.1.5.1.1 Multiple Sources

When multiple sources have provided attributes for a feature, attributes for each source will be returned in a different record. Every attribute provided by a source will be contained in that source's record, regardless of whether the values for attributes for multiple sources are the same or different. The Attribute means ID identifies the source for the attributes in each record.

ReqID-14352   When a feature has attributes derived from multiple sources, one or more attribute records SHALL be returned for each source.

ReqID-14353   In the case of multiple sources (hence multiple records), each record SHALL contain attributes derived from one single source.

ReqID-14354   All attributes provided by a source SHALL be returned, regardless of whether the attribute values are the same or different from values from other sources.

3.1.5.1.5.1.2 Multiple Values for an Attribute

When a single source contains multiple values for the same attribute, additional records will be used to convey the additional data. Fields that do not have additional values should be empty in additional records.

ReqID-14357   When a single source has provided more than one value for an attribute, the additional values SHALL be returned in additional records.

ReqID-14358   Additional records SHALL omit all values that were included in a previous record for the same feature.

3.1.5.1.5.2 Format

ReqID-11087   The **Geographic Entity Attribute Table** SHALL have a flat file format, with an ISO 8859-1 character set.

ReqID-11088   The **Geographic Entity Attribute Table** SHALL contain multiple **Geographic Entity Attribute** records, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-11089   The **Geographic Entity Attribute Table** record length SHALL be variable.

ReqID-11090   Each field within a **Geographic Entity Attribute Table** object record SHALL be delimited by a comma.

ReqID-12120   Specific fields within a **Geographic Entity Attribute Record** SHALL be enclosed in double quotes if indicated in Table 3.1.5.1.5.

ReqID-11092   The Record Layout SHALL be as defined in Table 3.1.5.1.5.

Table 3.1.5.1.5 Record Layout for Geographic Entity Attribute Table

Description	Field	BV	Type	Double Quotes
Harris ID	HID	No	N	
Key to Attribute MID	AMID_KEY	No	A	
Entity type	TYPE	No	A	
Name	NAME	No	A	Yes
Interior point longitude	LONG	No	A	
Interior point latitude	LAT	No	A	
Entity code	ECODE	No	A	Yes

3.1.5.1.5.3 Data Element Dictionary

ReqID-14359   Data elements of the **Geographic Entity Attribute Table** SHALL be as specified within this paragraph.

ReqID-11127   The *Harris ID* field SHALL be the reference to the HID field in the **Spatial File for Geographic Entities**.

ReqID-11131   The *Key to Attribute MID* SHALL be the *Record key* of the **Metadata** means record providing the basis for the attributes and characteristics in this record.

ReqID-12029   *Entity type* SHALL be the Census Bureau's 1-character designator for the type of geographic entity, as defined by the Southbound RT-G (ref. 3.1.1.6.3), and as matched per 3.1.4.7.1.4.

ReqID-12030   *Entity name* SHALL be the name of the geographic entity, as captured according to the requirements of 3.1.4.7.1.3.

ReqID-11128   The *Interior Point Longitude* field SHALL identify the longitude of a point within the geographic entity.

ReqID-11129   The *Interior Point Latitude* field SHALL identify the latitude of a point within the geographic entity.

ReqID-12031   The *Entity code* is the unique identifier for the geographic entity and SHALL be constructed by concatenating the *Entity fields* of Table 3.1.1.6-2 (for the *Entity type* of the entity), in the order shown in the table, without a delimiter.

ReqID-12032   The *Entity code* SHALL have a value of 0 (zero) if the entity is not provided in the Southbound **RT-G**.

ReqID-12033   The *Entity code* SHALL have a value of 0 (zero) if the *Entity code* cannot be identified.

3.1.5.1.6 Areal Feature Attribute Table

The **Areal Feature Attribute Table** consists of feature attributes and characteristics for all area landmark features and area hydro features contained in the **Spatial File for Areal Features**.

3.1.5.1.6.1 Purpose

ReqID-11135   The **Areal Feature Attribute Table** SHALL describe feature attributes and characteristics for area landmark features and area hydro features in the **Spatial File for Areal Features**.

ReqID-11136   Attribute and characteristic data for all area landmark features and area hydro features SHALL be contained in a single **Areal Feature Attribute Table**.

ReqID-11137   The **Areal Feature Attribute Table** SHALL contain one or more records for every areal feature contained in the **Spatial File for Areal Features**.

3.1.5.1.6.1.1 Multiple Sources

When multiple sources have provided attributes for a feature, attributes for each source will be returned in a different record. Every attribute provided by a source will be contained in that source's record, regardless of whether the values for attributes for multiple sources are the same or different. The *Attribute means ID* identifies the source for the attributes in each record.

ReqID-14383   When a feature has attributes derived from multiple sources, one or more attribute records SHALL be returned for each source.

ReqID-14384   In the case of multiple sources (hence multiple records), each record SHALL contain attributes derived from one single source.

ReqID-14385   All attributes provided by a source SHALL be returned, regardless of whether the attribute values are the same or different from values from other sources.

3.1.5.1.6.1.2 Multiple Values for an Attribute

When a single source contains multiple values for the same attribute, additional records will be used to convey the additional data. Fields that do not have additional values should be empty in additional records.

ReqID-14388   When a single source has provided more than one value for an attribute, the additional values SHALL be returned in additional records.

ReqID-14389   Additional records SHALL omit all values that were included in a previous record for the same feature.

3.1.5.1.6.2 Format

ReqID-11140   The **Areal Feature Attribute Table** SHALL have a flat file format, with an ISO 8859-1 character set.

ReqID-11141   The **Areal Feature Attribute Table** SHALL contain multiple **Areal Feature Attribute Records**, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-11142   The **Areal Feature Attribute Table** record length SHALL be variable.

ReqID-11143   Each field within an **Areal Feature Attribute Table** record SHALL be delimited by a comma.

ReqID-12121   Specific fields within an **Areal Feature Attribute Record** SHALL be enclosed in double quotes as indicated in Table 3.1.5.1.6.

ReqID-11145   The Record Layout SHALL be as defined in Table 3.1.5.1.6.

Table 3.1.5.1.6 Record Layout for Areal Feature Attribute Table

Description	Field	EV	Type	Double Quotes
Harris ID	HID	No	N	
Key to Attribute MID	AMID_KEY	No	A	
Non-Census ID	NCID	Yes	A	Yes
Empty Field	EMPTY	Yes		
Census feature class	CFCC	No	A	
Feature name	FENAME	Yes	A	Yes
Census area landmark ID	ALID	Yes	N	
Area hydro feature class	FE_CLASS	Yes	A	
City hall feature class	CITYHALL	Yes	A	
Police station feature class	POLICE	Yes	A	
Fire department feature class	FIRE	Yes	A	
Library feature class	LIBRARY	Yes	A	
Transportation feature class	TRANS	Yes	A	
Government/Institutional feature class	INST	Yes	A	
Commercial/Other feature class	COMM	Yes	A	
Hydrographic category	HY_CAT	Yes	A	

Description	Field	EV	Type	Double Quotes
NHD GNIS ID	GNIS_ID	Yes	N	
NHD Feature Code	FCODE	Yes	N	
NHD Reach Code	RCH_CODE	Yes	N	
NHD Reach Date	RCH_DATE	Yes	N	
Key to Spatial MID	SMID_KEY	Yes	A	

3.1.5.1.6.3 Data Element Dictionary

ReqID-14394   Data elements of the **Areal Feature Attribute Table** SHALL be as specified below:

ReqID-11260   The *Harris ID* field SHALL be the reference to the feature record in the **Spatial File for Areal Features**.

ReqID-14395   The *Key to Attribute MID* SHALL be the *Record key* of the **Metadata** means record providing the basis for the attributes and characteristics in this record.

ReqID-14397   The *Non-Census ID* SHALL be the identifier used for the area feature in the source data, as captured according to the requirements of the feature class:

      Area hydro features per 3.1.4.4.1.1

      Area landmark features per 3.1.4.6.1.1

ReqID-16000   The *Empty field* SHALL be devoid of data, as illustrated by ,, (comma comma with no space in between).

ReqID-14399   The *Census feature class* SHALL be the feature class code, as captured and encoded per the requirements of the feature class:

      Area hydro features per 3.1.4.4

      Area landmark features per 3.1.4.6

ReqID-14400   The *Feature name* SHALL be the name of the area feature, as captured from the source, per the requirements of the feature class:

      Area hydro features per 3.1.4.4.1.3

      Area landmark features per 3.1.4.6.1.3

ReqID-14401   The *Census area landmark ID* SHALL be the 10 digit *Record ID* for the area feature, as defined in the Southbound **RT-K**.

      The field will be *Empty* for area landmark and hydro features that have not been correlated with landmark or hydro features in the Southbound **RT-K**.

ReqID-14402   The *Area hydro feature class* SHALL indicate the special feature class of the area hydro feature, as captured from the source, per the requirements of the feature class:

      Area hydro features per 3.1.4.4.1.14

ReqID-14403   The *City hall feature class* SHALL indicate a city hall class landmark feature, as captured and encoded per the requirements of the feature class:

      Area landmark features per 3.1.4.6.1.4

ReqID-14404   The *Police station feature class* SHALL indicate a police station class landmark feature, as captured and encoded per the requirements of the feature class:

      Area landmark features per 3.1.4.6.1.5

ReqID-14405 The ***Fire department feature class*** SHALL indicate a fire department class landmark feature, as captured and encoded per the requirements of the feature class:

Area landmark features per 3.1.4.6.1.6

ReqID-14406 The ***Library feature class*** SHALL indicate a library class landmark feature, as captured and encoded per the requirements of the feature class:

Area landmark features per 3.1.4.6.1.7

ReqID-14407 The ***Transportation feature class*** SHALL indicate a transportation class landmark feature, as captured and encoded per the requirements of the feature class:

Area landmark features per 3.1.4.6.1.8

ReqID-14408 The ***Government/Institutional feature class*** SHALL indicate a government or institutional class landmark feature, as captured and encoded per the requirements of the feature class:

Area landmark features per 3.1.4.6.1.9

ReqID-14409 The ***Commercial/Other feature class*** SHALL indicate a commercial or other class landmark feature, as captured and encoded per the requirements of the feature class:

Area landmark features per 3.1.4.6.1.10

ReqID-14410 The ***Hydrographic category*** SHALL indicate the intermittent or perennial nature of a hydro feature, as captured and encoded per the requirements for the feature class:

Hydro landmark features per 3.1.4.4.1.11

ReqID-14411 The ***NHD GNIS ID*** characteristic SHALL be as captured from the NHD per 3.1.4.4.1.15

ReqID-14412 The ***NHD Feature Code*** characteristic SHALL be as captured from the NHD per 3.1.4.4.1.16

ReqID-14413 The ***NHD Reach Code*** characteristic SHALL be as captured from the NHD per 3.1.4.4.1.17

ReqID-14414 The ***NHD Reach Date*** characteristic SHALL be as captured from the NHD per 3.1.4.4.1.18

ReqID-14415 The ***Key to Spatial MID*** SHALL be the ***Record key*** of the **Metadata** means record providing the basis for the spatial data in the **Spatial File for Areal Features**.

3.1.5.1.7 Point Feature Attribute Table

The **Point Feature Attribute Table** consists of feature attributes and characteristics for point landmark features, point hydro features, and point road features contained in the **Spatial File for Point Features**.

3.1.5.1.7.1 Purpose

ReqID-11271 The **Point Feature Attribute Table** SHALL describe feature attributes and characteristics for point landmark features, point hydro features, and point road features in the **Spatial File for Point Features**.

ReqID-11272 Attribute and characteristic data for all point features in a county SHALL be contained in a single **Point Feature Attribute Table**.

ReqID-11273 The **Point Feature Attribute Table** SHALL contain one or more records for every point feature contained in the **Spatial File for Point Features**.

3.1.5.1.7.1.1 Multiple Sources

When multiple sources have provided attributes for the feature, attributes for each source will be returned in a different record. Every attribute provided by a source will be contained in that source's record, regardless of whether the values for attributes for multiple sources are the same or different. The ***Attribute means ID*** identifies the source for the attributes in each record.

ReqID-14421   When a feature has attributes derived from multiple sources, one or more attribute records SHALL be returned for each source.

ReqID-14422   In the case of multiple sources (hence multiple records), each record SHALL contain attributes derived from one single source.

ReqID-14423   All attributes provided by a source SHALL be returned, regardless of whether the attribute values are the same or different from values from other sources.

3.1.5.1.7.1.2 Multiple Values for an Attribute

When a single source contains multiple values for the same attribute, additional records will be used to convey the additional data. Fields that do not have additional values should be empty in additional records.

ReqID-14426   When a single source has provided more than one value for an attribute, the additional values SHALL be returned in additional records.

ReqID-14427   Additional records SHALL omit all values that were included in a previous record for the same feature.

3.1.5.1.7.2 Format

ReqID-11276   The **Point Feature Attribute Table** SHALL have a flat file format, with an ISO 8859-1 character set.

ReqID-11277   The **Point Feature Attribute Table** SHALL contain zero or more **Point Feature Attribute Records**, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-11278   The **Point Feature Attribute Table** record length SHALL be variable.

ReqID-11279   Each field within a **Point Feature Attribute Table** record SHALL be delimited by a comma.

ReqID-12150   Specific fields within a **Point Feature Attribute Record** SHALL be enclosed in double quotes as indicated in Table 3.1.5.1.7.

ReqID-11281   The Record Layout SHALL be as defined in Table 3.1.5.1.7.

Table 3.1.5.1.7 Record Layout for Point Feature Attribute Table

Description	Field	EV	Type	Double Quotes
Harris ID	HID	No	N	
Key to Attribute MID	AMID_KEY	No	A	
Non-Census ID	NCID	Yes	A	Yes
Empty Field	EMPTY	Yes		
Census feature class	CFCC	No	A	
Feature name	FENAME	Yes	A	Yes
Barrier to automobile traffic	RD_BAR	Yes	A	
Census point landmark ID	PLID	Yes	N	

Description	Field	EV	Type	Double Quotes
Point hydro feature class	FE_CLASS	Yes	A	
City hall feature class	CITYHALL	Yes	A	
Police station feature class	POLICE	Yes	A	
Fire department feature class	FIRE	Yes	A	
Library feature class	LIBRARY	Yes	A	
Transportation feature class	TRANS	Yes	A	
Government/Institutional feature class	INST	Yes	A	
Commercial/Other feature class	COMM	Yes	A	
NHD GNIS ID	GNIS_ID	Yes	N	
NHD Feature Code	FCODE	Yes	N	
Key to Spatial MID	SMID_KEY	Yes	A	

3.1.5.1.7.3 Data Element Dictionary

ReqID-14433   Data elements of the **Point Feature Attribute Table** SHALL be as specified below:

ReqID-11366   The *Harris ID* field SHALL be the foreign key of the **Spatial File for Point Features** record identifying the spatial coordinates for the point feature.

ReqID-11370   The *Key to Attribute MID* SHALL be the *Record key* of the **Metadata** means record providing the basis for the attributes and characteristics in this record.

ReqID-14434   The *Non-Census ID* SHALL be the identifier used for the point feature in the source data, as captured from the source, per the requirements of the feature class:

> Point road features per 3.1.4.2.1.1

> Point hydro features per 3.1.4.4.1.1

> Point landmark features per 3.1.4.6.1.1

ReqID-16001   The *Empty field* SHALL be devoid of data, as illustrated by ,, (comma comma with no space in between).

ReqID-11368   The *Census feature class* SHALL be the Census feature class code, as captured and encoded per the requirements of the feature class:

> Point road features per 3.1.4.2

> Point hydro features per 3.1.4.4

> Point landmark features per 3.1.4.6

ReqID-11369   The *Feature name* SHALL be the name of the point feature, as captured from the source, per the requirements of the feature class:

> Point road features per 3.1.4.2.1.3

> Point hydro features per 3.1.4.4.1.3

> Point landmark features per 3.1.4.6.1.3

ReqID-14436   The *Barrier to automobile movement* SHALL identify the presence of a point barrier in a road, per the requirements of the feature class:

> Point road features per 3.1.4.2.1.12

ReqID-11367   The *Census point landmark ID* SHALL be the 10 digit *Record ID* for the point feature, according to the feature class:

>Point road features, as defined in the Southbound **RT-0**

>Point hydro features, as defined in the Southbound **RT-L**

>Point landmark features, as defined in the Southbound **RT-L**.

>The field will be *Empty* for point road, hydro, and landmark features that have not been correlated with point road features in the Southbound **RT-0** or point hydro or landmark features in the Southbound **RT-K**.

ReqID-14437   The *Point hydro feature class* SHALL indicate the special feature class of the point hydro feature, as captured and encoded per the requirements of the feature class:

>Point hydro features per 3.1.4.4.1.13

ReqID-14438   The *City hall feature class* SHALL indicate a city hall class landmark feature, as captured and encoded per the requirements of the feature class:

>Point landmark features per 3.1.4.6.1.4

ReqID-14439   The *Police station feature class* SHALL indicate a police station class landmark feature, as captured and encoded per the requirements of the feature class:

>Point landmark features per 3.1.4.6.1.5

ReqID-14440   The *Fire department feature class* SHALL indicate a fire department class landmark feature, as captured and encoded per the requirements of the feature class:

>Point landmark features per 3.1.4.6.1.6

ReqID-14441   The *Library feature class* SHALL indicate a library class landmark feature, as captured and encoded per the requirements of the feature class:

>Point landmark features per 3.1.4.6.1.7

ReqID-14442   The *Transportation feature class* SHALL indicate a transportation class landmark feature, as captured and encoded per the requirements of the feature class:

>Point landmark features per 3.1.4.6.1.8

ReqID-14443   The *Government/Institutional feature class* SHALL indicate a government or institutional class landmark feature, as captured and encoded per the requirements of the feature class:

>Point landmark features per 3.1.4.6.1.9

ReqID-14444   The *Commercial/Other feature class* SHALL indicate a commercial or other class landmark feature, as captured and encoded per the requirements of the feature class:

>Point landmark features per 3.1.4.6.1.10

ReqID-14446   The *NHD GNIS ID* characteristic SHALL be as captured from the NHD per 3.1.4.4.1.15

ReqID-14447   The *NHD Feature Code* characteristic SHALL be as captured from the NHD per 3.1.4.4.1.16

ReqID-14450   The *Key to Spatial MID* SHALL be the *Record key* of the **Metadata** means record providing the basis for the spatial data for this feature in the **Spatial File for Point Features**.

3.1.5.1.8 Northbound Metadata

MTAIP metadata records contain additional information about data in the other Northbound MTAIP records. Metadata is "data about data" is critical in creating a TIGER database to support the geographic needs of the Census Bureau mission and to provide a framework for other federal, tribal, state, and local government use.

MTAIP metadata is concerned with describing data (sources and quality values), defining processes for changing that data (rules, authorities, and tasking), and tracking changes made to the data (transactions).

3.1.5.1.8.1 Purpose

MTAIP metadata records can be divided into two functional classes: header records and transaction records. Header records are generally focused on rules, authorities, sources, qualities, and tasking. Transaction records are generally focused on describing the process by which changes have been made to MTAIP data. Northbound metadata consists of both transaction records and header records.

MTAIP employs six (6) types of metadata header records: rule, authority, source, quality, tasking, and means. There is also a comment field that may be appended to one of the header records to provide additional information relevant to the record. These records are often interdependent. Northbound metadata header records are defined in 3.1.5.1.8.3.

MTAIP employs one type of metadata transaction record, which is configured different ways by the use of variable fields. Northbound metadata transaction records are defined in 3.1.5.1.8.4.

3.1.5.1.8.2 General Metadata Record Format

Metadata records have a variable length. Except for the first few fields, which are fixed, the length and structure of a record depends upon the information contained therein.

ReqID-9338   Improved TIGER data output SHALL output the **Metadata File**, providing additional information associated with records within other MTAIP sub files.

ReqID-9342   The **Metadata File** SHALL be in a flat file format, with an ISO 8859-1 character set.

ReqID-9343   The **Metadata File** SHALL consist entirely of multiple **Metadata** records, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-14813   **Metadata** records SHALL consist of two parts: a fixed field part and a variable part, except as defined in ReqID-16084, immediately below.

ReqID-16084   Metadata transaction records for new geographic entities, areas, and points (those that are not correlated with Southbound TIGER entities, areas, and points) SHALL consist of a single part: a fixed field part.

ReqID-9347   Improved TIGER data output SHALL output **Metadata** records with a variable length, varying according to the information contained therein.

ReqID-14815   The minimum length for a **Metadata** record SHALL be 29 characters.

ReqID-14816   The maximum length for a **Metadata** record SHALL be 2040 characters.

ReqID-9339   Improved TIGER data output SHALL output two types of records within **Metadata**: the **Header Record** and the **Transaction Record**.

3.1.5.1.8.3 Metadata Header Record Format

Each Northbound metadata header record contains six fixed length fields and one variable length field. The fixed fields are defined in 3.1.5.1.8.3.1, and are the same for all types of metadata header records. The variable field defines specific rules, authorities, sources, qualities, tasking, means, and comments

associated with the southbound MTAIP data, and is defined in 3.1.5.1.8.3.2 – 3.1.5.1.8.3.8. The structure of the variable field consists of three parts: an initial tag, the metadata header record content, and an ending tag. The nature of these fields and their relationships are summarized in Table 3.1.5.1.8-1.

ReqID-14820   Improved TIGER data output SHALL output Northbound metadata header records containing one of the following fields: Rule, Authority, Source, Quality, Tasking, or Means.

3.1.5.1.8.3.1   Header Record Fixed Field Layout and Data Element Description

ReqID-11857   The Record Layout for the Fixed Field portion of **Metadata** records SHALL be as identified in Table 3.1.3.1.8-2.

Definition of Means ID, MID, AMID, SMID, and MID Keys

ReqID-14825   The 10 character ***Record ID*** in a **Means** Metadata Header Record SHALL also be known as the ***Means ID*** or the ***MID.***

> The basis for spatial values is referred to as the ***Spatial Means***, or ***SMID***.

> The basis for attribute values is referred to as the ***Attribute Means***, or ***AMID***.

Table 3.1.5.1.8-1 Header Type Record Relationship Table

Header Record Type	Rule	Authority	Source	Quality	Tasking	Means
Rule	Identifies a specific rule	Must have an authority	May be specific to one or more sources, or may not address a source at all.	May be specific to one or more quality value, or may not address a quality value at all.	May apply to one or more activities. May apply to all activities	
Authority		Identifies a specific authority				
Source			Identifies a specific source	Must have one or more quality records.		
Quality				Identifies one or more quality values associated with a source		
Tasking					Identifies a specific activity	
Means	May identify one or more rules applicable to NB data or MTAIP processing	Must identify one or more authorities for a rule. May identify authorities for a Means.	Must identify all NB data sources, as well as TIGER source.	Must identify the quality values for all sources, all applicable feature types.	Identifies the activities to which NB data apply.	Provides a means for identifying multiple, applicable header records as the means by which a data are established.
Comment	May be about anything, but does not have the force of a rule					

ReqID-14829   The Metadata header ***Record key*** SHALL be defined as the 17 character ***Record type***, ***Record ID***, and ***Date***.

ReqID-15917   A **MID Key** SHALL be defined as the 17 character **Record key** for a Means Metadata Header Record.

The **MID Key** is the mechanism by which other Northbound files refer to the record providing the **Means** (or basis) for their spatial and attribute values and characteristics.

Table 3.1.3.1.8-2 Record Layout for Fixed Field of Metadata Header Record

Description	Field	BV	Fmt	Type	Beg	End	Len
Record type	RT	No	L	A	1	1	1
Record ID	RECID	No	R	N	2	11	10
Activity date	ADATE	No	R	N	12	17	6
Action code	FACTION	No	L	A	18	18	1
Condition code	FCONDITION	No	L	A	19	19	1
Activity ID	ACTIVITY	No	L	A	20	29	10

ReqID-15919   A **MID Key** that refers to a **SMID** SHALL be known as a **SMID Key**.

ReqID-15920   A **MID Key** that refers to an **AMID** SHALL be known as an **AMID Key**.

ReqID-14830   Improved TIGER data output SHALL output **Fixed Field** data elements as defined below.

ReqID-9350   The **Record type** SHALL identify the type of **Metadata** record, as follows:

M = The record is a Metadata Header record

ReqID-14833   The **Record ID** SHALL be a unique identifier for the record.

ReqID-14834   The **Record ID** SHALL be a ten character field, defined as follows:

ReqID-14835   The first character SHALL be as follows:

R = the record is a Rule Metadata Header Record

A = the record is an Authority Metadata Header Record

S = the record is a Source Metadata Header Record

Q = the record is a Quality Metadata Header Record

T = the record is a Tasking Metadata Header Record

0 (zero) = the record is a Means Metadata Header Record

ReqID-14842   Characters two through ten SHALL be a numeric value.

ReqID-14843   The range of the numeric value SHALL be 0 to 999,999,999.

ReqID-14844   The range 0 to 999,000,000 SHALL be reserved for use by the Census Bureau.

ReqID-14845   The range 999,000,001 to 999,999,999 SHALL be reserved for use by the contractor.

ReqID-14846   The **Activity date** SHALL be the date the file was created (YYMMDD format).

ReqID-14847   The **Action code** SHALL identify the action taken on a record, as follows:

H = The record is a Metadata Header record

ReqID-14849   The **Condition code** SHALL refer to the relationship between the referenced feature and the source material.

X = The Condition code is not applicable for Header records.

ReqID-14851 The *Activity ID* SHALL identify the organization responsible for providing the information in the record.

ReqID-14852 Information provided by the Census Bureau SHALL have the *Activity ID* of:

> CensusGEO0 (the last two characters are the letter O, followed by the number 0)

ReqID-14854 Information provided by the contractor SHALL have the *Activity ID* of:

> HarrisCorp

3.1.5.1.8.3.2 Rule Metadata Header Record

The *Rule* record may be used to define particular rules employed by the contractor during MTAIP processing. In every case, the Census Bureau will have originally provided *Rules* in the Southbound MTAIP data. Northbound rule records echo back *Rules* that were applied and reference those rules in metadata for applicable features.

The *Rule* record is conditional, meaning that the record is not required. The record is present when (and only when) the contractor needs to identify a specific rule that has been applied during MTAIP processing.

The *Rule* record contains a reference to an authority, authority date, and the actual rule in textual form. The *Rule* record may also contain references to one or more sources, quality values, and/or tasking, for which the rule has applicability.

ReqID-14860 Rules in the Northbound metadata SHALL be among those provided in the Southbound metadata.

3.1.5.1.8.3.2.1 Purpose

The *Rule* record identifies special rules or guidelines applied during processing. The Rule record is not always present, and when present, may have limited applicability.

ReqID-14863 Improved TIGER data output SHALL output *Rule* records describing rules applied by the contractor during MTAIP processing or Northbound data generation.

3.1.5.1.8.3.2.2 Obligation

The obligation of the *Rule* record is *Conditional*. The *Rule* record is present in the Northbound metadata when the contractor identifies a specific rule used during MTAIP processing.

ReqID-14866 Improved TIGER data output SHALL output zero or more metadata records containing a *Rule* record.

3.1.5.1.8.3.2.3 Rule Metadata Header Record Fixed Fields

The *RecordID* fixed field of the Rule Metadata Header Record (Table 3.1.5.1.8-2) is the *Rule ID*, and is used by other records in referencing the *Rule*.

ReqID-14869 Rule Metadata Header Record Fixed Fields SHALL be as defined in 3.1.5.1.8.3.1.

ReqID-14870 The *RuleID* SHALL be defined as the 10 character *RecordID* in the fixed field of the Rule Metadata Header Record.

3.1.5.1.8.3.2.4 Rule Record Variable Field

ReqID-14872 Rule Record Variable Field SHALL be as defined below:

ReqID-14873   The format and content of the variable field of a Northbound Rule Metadata Header Record SHALL be identical to the variable field of one of the Southbound Rule Metadata Header Records.

3.1.5.1.8.3.2.4.1 Tags

ReqID-14875   The tags for the Rule record SHALL be as follows:

        Initial tag: <RUL>   Ending tag: </RUL>

3.1.5.1.8.3.2.4.2 Structure

ReqID-14878   The *Rule* field SHALL be composed of sub-fields, structured as follows:

    <RUL>AuthorityID:CDATE:[SourceID:[CQVrecordID:]][TaskingID:]Rule</RUL>

> **Note:** In the example above, the brackets indicate conditional fields and serve to group the data for ease of reading. The brackets are not present in the actual data. The same applies to other definitions of sub-field structure throughout this section on northbound metadata.
>
> The colon (:) delimiter is required where it is shown in the structure and the construction rules.

3.1.5.1.8.3.2.4.3 Construction

ReqID-14883   A metadata record SHALL contain no more than one *Rule* field.

ReqID-14884   A *Rule* field SHALL open with an initial tag, defined per 3.1.5.1.8.3.2.4.1.

ReqID-14885   A *Rule* field SHALL contain one *AuthorityID* sub-field.

ReqID-14886   The *AuthorityID* sub-field SHALL consist of the following:

        AuthorityID   (a ten digit identifier for an *Authority*, per 3.1.5.1.8.3.3)

ReqID-14888   The *AuthorityID* sub-field SHALL be followed by a colon (:) character.

ReqID-14889   A *Rule* field SHALL contain one *CDATE* sub-field.

ReqID-14890   The *CDATE* sub-field SHALL consist of the following:

        CDATE   (a six character value for the date the rule was created, formatted as YYMMDD.)

ReqID-14892   The *CDATE* sub-field SHALL be followed by a colon (:) character.

If the *Rule* that is being defined by the *Rule* field pertains to sources, then the *CDATE* sub-field is followed by one or more *Source* sub-fields. There is one *Source* sub-field for every source affected by the rule (exception – if the rule pertains to all sources, a single *Source* sub-field will so state).

ReqID-14894   A *Rule* field SHALL contain one or more *Source* sub-fields if the *Rule* being defined specifically pertains to sources.

ReqID-14895   Each *Source* sub-field SHALL consist of the following:

        SourceID   (a ten digit identifier for a *Source*, per 3.1.5.1.8.3.4)

        Exception: When the *Rule* applies to all sources the *SourceID* is the following text:

        S=ALL

ReqID-14899   The *SourceID* sub-field SHALL be followed by a colon (:) character.

If the *Rule* that is being defined pertains to sources, and specifically applies to source quality values, then the **Source** sub-field is followed immediately by one or more **Quality** sub-fields. When the rule pertains to more than one source, with one or more quality values specific to each source, the **Quality** sub-field(s) are "nested" following their applicable **Source** sub-field.)

ReqID-14901   A **Rule** field SHALL contain one or more **Quality** sub-fields if the *Rule* being defined specifically pertains to sources and to the **Census Quality Values** of the sources.

ReqID-14902   Each **Quality** sub-field SHALL consist of the following:

> **QualityID**   (a ten digit identifier for a *Census Quality Value*, per 3.1.5.1.8.3.5)

> Exception: When the *Rule* applies to all quality values for the source, the **QualityID** is the following text:

> Q=ALL

ReqID-14906   The **QualityID** sub-field SHALL be followed by a colon (:) character.

If the *Rule* that is being defined pertains to one or more activities, then the preceding sub-field will be followed by one or more **Tasking** sub-fields. The term "activity", when used in this context, defines a particular organization performing MTAIP processing, when that organization is specifically affected by the rule. Additionally, a **Tasking** sub-field may identify a specific processing thread for which the rule applies.

ReqID-14908   A **Rule** field SHALL contain one or more **Tasking** sub-fields if the *Rule* being defined specifically pertains to Census Bureau defined *Activities*.

ReqID-14909   The **Tasking** sub-field SHALL consist of the following:

> **TaskingID**   (a ten digit identifier for an *Activity*, per 3.1.5.1.8.3.6)

> Exception: When the *Rule* applies to all activities, the **TaskingID** is the following text:

> T=ALL

ReqID-14913   The **TaskingID** sub-field SHALL be followed by a colon (:) character.

The **Rule** sub-field defines the actual *Rule* being established by the **Rule** field.

ReqID-14915   A **Rule** field SHALL contain one *Rule* statement.

ReqID-14916   The *Rule* statement SHALL be in free text, establishing the following:

> A *Rule* providing specific direction applied by the contractor performing MTAIP production.

ReqID-14918   A **Rule** field SHALL close with an ending tag, defined per 3.1.5.1.8.3.2.4.1.

3.1.5.1.8.3.3 Authority Metadata Header Record

The *Authority* record is used to establish an authority reference record identifying the authority by which a rule is stated or asserted. The record is also used to define the version of the specification used in a MTAIP Northbound data delivery. An example of an authority is "MTAIP Technical Requirements Specification, version 0, as modified by change requests 0001, 0002, and 0004."

When an *Authority* relates to a *Rule*, the *Census Bureau* will have originally provided the *Authority* in the Southbound MTAIP data. Northbound authority records echo back *Authorities* that were applied and reference those authorities in metadata for applicable features. These **Authority** records are conditional,

meaning that the record is not required, with the exception that an *Authority* record is required when a *Rule* record is present, in order to establish an *Authority* for the *Rule*.

The *Authority* record is required to define the specification version. These *Authority* records need not have been provided to the contractor in the Southbound metadata.

3.1.5.1.8.3.3.1 Purpose

The *Authority* record describes an authority by which an action is taken and defines the spec version applicable to the data.

ReqID-14925   Improved TIGER data output SHALL output *Authority* records describing an authority by which the Census Bureau has applied a rule contained with a *Rule* metadata record.

ReqID-14926   Improved TIGER data output SHALL output *Authority* records defining the version of the MTAIP specification applicable to the Northbound delivery (version number and applicable change requests).

3.1.5.1.8.3.3.2 Obligation

The Obligation for the *Authority* record is *Required*. One **Authority** record will be present in the Northbound metadata to define the specification version and all applicable change requests in the baseline used to process and output the Northbound MTAIP data. Other *Authority* records may be present to define the *Authority* by which a *Rule* is applied

ReqID-14929   Improved TIGER data output SHALL output one or more metadata records containing an *Authority* record.

3.1.5.1.8.3.3.3 Authority Metadata Header Record Fixed Fields

The *RecordID* fixed field of the Authority Metadata Header Record (Table 3.1.5.1.8-2) is the *Authority ID,* and is used by other records in referencing the *Authority*.

ReqID-14932   Authority Metadata Header Record Fixed Fields SHALL be as defined in 3.1.5.1.8.3.1.

ReqID-14933   The *AuthorityID* SHALL be defined as the 10 character *RecordID* in the fixed field of the Authority Metadata Header Record.

3.1.5.1.8.3.3.4 Authority Metadata Header Record Variable Field

ReqID-14935   Authority Metadata Header Record Variable Fields SHALL be as defined below:

3.1.5.1.8.3.3.4.1 Tags

ReqID-14937   The tags for the *Authority* field SHALL be as follows:

> Initial tag: <AUT>   Ending tag:</AUT>

3.1.5.1.8.3.3.4.2 Structure

ReqID-14940   The *Authority* field SHALL be composed of sub-fields, structured as follows:

> <AUT>Authority/citation</AUT>

3.1.5.1.8.3.3.4.3 Construction

ReqID-14943   A metadata record SHALL contain no more than one *Authority* field.

ReqID-14944   An *Authority* field SHALL open with an initial tag, defined per 3.1.5.1.8.3.3.4.1.

ReqID-14945   An *Authority* field SHALL contain one *Authority* statement.

ReqID-14946   The *Authority* statement SHALL be in free text, establishing one of the following:

The authority by which the Census Bureau applied a rule.

The specification version applicable to the data.

ReqID-14949   An *Authority* field SHALL close with an ending tag, defined per 3.1.5.1.8.3.3.4.1.

3.1.5.1.8.3.4 Source Metadata Header Record

The *Source* record is used to uniquely identify a source from which information may be extracted or to identify the TIGER file being processed. An example of a source is "Aiken County, South Carolina, Office of Transportation".

A *Source* record is required for each and every GFI source. Each *Source* record will have one or more associated *Quality* records.

3.1.5.1.8.3.4.1 Purpose

The *Source* field describes a source for MTAIP processing.

ReqID-14955   Improved TIGER data output SHALL output a *Source* field describing the TIGER data contained in the Northbound files.

ReqID-14956   Improved TIGER data output SHALL output *Source* fields describing each source of data used in MTAIP processing.

3.1.5.1.8.3.4.2 Obligation

The obligation for the **Source** field is Required. One or more **Source** fields will be present in the Northbound metadata to define and describe the source of data used in MTAIP processing.

ReqID-14959   Improved TIGER data output SHALL output one or more *Source* metadata records containing a *Source* field.

3.1.5.1.8.3.4.3 Source Metadata Header Record Fixed Fields

The *RecordID* fixed field of the Source Metadata Header Record (Table 3.1.5.1.8-2) is the *SourceID*, and is used by other records in referencing the *Source*.

ReqID-14962   Source Metadata Header Record Fixed Fields SHALL be as defined in 3.1.5.1.8.3.1.

ReqID-14963   The *SourceID* SHALL be defined as the 10 character *RecordID* in the fixed field of the Source Metadata Header Record.

3.1.5.1.8.3.4.4 Source Metadata Header Record Variable Field

ReqID-14965   Source Metadata Header Record Variable Field SHALL be as defined below.

3.1.5.1.8.3.4.4.1 Tags

ReqID-14967   The tags for the *Source* field SHALL be as follows:

Initial tag: <SOU>   Ending tag: </SOU>

3.1.5.1.8.3.4.4.2 Structure

ReqID-14970   A *Source* field SHALL be composed of sub-fields, structured as follows:

<SOU>CensusSourceFile:SourceDescription</SOU>

3.1.5.1.8.3.4.4.3 Construction

ReqID-14973   A metadata record SHALL contain no more than one *Source* field.

ReqID-14974   A *Source* field SHALL open with an initial tag, defined per 3.1.5.1.8.3.4.4.1.

ReqID-14975   A *Source* field SHALL contain one *CensusSourceFile* sub-field.

ReqID-14976   The *CensusSourceFile* sub-field SHALL be a variable length element, consisting of a Census Bureau defined unique renaming of the source data.

ReqID-14977   The *CensusSourceFile* sub-field SHALL be constructed as defined immediately below:

ReqID-14978   The first element of the *CensusSourceFile* sub-field SHALL be the *FIPS state code*.

ReqID-14979   The *FIPS state code* element SHALL be the two character FIPS 5 code identifying the state (or equivalent entity) in which the source provides coverage.

ReqID-14980   The *FIPS state code* element SHALL be 00 (two zeros) if the file is multi-state. (A source is considered to be multi-state if the Census Bureau has determined that the purpose of the file is to provide coverage of more than one state.)

ReqID-14981   The *FIPS state code* element SHALL be right justified and zero-filled for values less than ten (e.g., 05).

ReqID-14982   There SHALL be no delimiter between the *FIPS state code* element and the following element.

ReqID-14983   The second element of the *CensusSourceFile* sub-field SHALL be the *FIPS county code*.

ReqID-14984   The *FIPS county code* element SHALL be the three character FIPS 6 code identifying the county (or equivalent entity) in which the source provides coverage.

ReqID-14985   The *FIPS county code* element SHALL be 000 (three zeros) if the file is multi-county. (A source is considered to be multi-county if the Census Bureau has determined that the purpose of the file is to provide coverage of more than one county.)

ReqID-14986   The *FIPS county code* element SHALL be right justified and zero-filled for values less than one hundred (e.g., 023, 008).

ReqID-14987   There SHALL be no delimiter between the *FIPS county code* element and the following element.

ReqID-14988   The third element of the *CensusSourceFile* sub-field SHALL be the *FIPS-55 code*.

ReqID-14989   The *FIPS-55 code* element SHALL be five (5) characters in length.

ReqID-14990   The *FIPS-55 code* element SHALL be the entity in which the source provides coverage, representing a County Subdivision, Subbarrio, Consolidated City, Place, or Alaska Native Regional Corporation.

ReqID-14991   The *FIPS-55 code* element SHALL be 00000 (five zeros) if the file covers multiple FIPS-55 entities.

ReqID-14992   The *FIPS-55 code* element SHALL be right justified and zero-filled for values less than five characters.

ReqID-14993   There SHALL be no delimiter between the *FIPS-55 code* element and the following element.

ReqID-14994   The fourth element of the *CensusSourceFile* sub-field SHALL be the *File date*.

ReqID-14995   The *File date* SHALL be an eight character date (YYYYMMDD), representing the "as of" date of the source data.

ReqID-14996   For files created from GIS, the reference date or the file date SHALL be used as the "as-of" date.

ReqID-14997   For files created via field data collection, the date of last update SHALL be used as the "as-of" date.

ReqID-14998   For files created from other source (e.g., imagery or hardcopy map), the date of the source SHALL be used as the "as-of" date.

ReqID-14999   If the "as-of" date is not known, the date of acquisition of the source SHALL be used for the *File date*.

ReqID-15000   There SHALL be no delimiter between the *File date* element and the following element.

ReqID-15001   The fifth element of the *CensusSourceFile* sub-field SHALL be the Census Bureau's *TED ID*.

ReqID-15002   The length of the *TED ID* element SHALL be six (6) characters.

ReqID-15003   When the source is a file within a multi-file dataset (e.g., individual images from DOQQs), the *TED ID* element SHALL be the alphanumeric code for a tile within the multi-file dataset-coding scheme.

ReqID-15004   The *TED ID* element SHALL be right justified and zero-filled for values less than six characters.

ReqID-15005   The value of the *TED ID* element for TIGER source SHALL be the letter T, followed by the *FIPS state code*, followed by the *FIPS county code*.

ReqID-15006   There SHALL be no delimiter between the *TED ID* element and the following element.

ReqID-15007   The sixth element of the *CensusSourceFile* sub-field SHALL be the *FeatureCode*.

ReqID-15008   The length of the *FeatureCode* element SHALL be variable, depending on the number of *FeatureTypeCodes* in the element.

ReqID-15009   The *FeatureCode* element SHALL consist of one or more *FeatureTypeCodes*, depending on the number and type of features that are contained within the source data.

ReqID-15010   A *FeatureTypeCode* SHALL be defined as a one (1)-character code identifying a feature type.

ReqID-15011   Values for *FeatureTypeCode* SHALL be as identified in Table 3.1.5.1.8-3.

Table 3.1.5.1.8-3 Values for Metadata FeatureTypeCode

FeatureTypeCode	Feature Type
A	Road feature
B	Rail feature
C	Miscellaneous transportation feature
E	Physical feature
F	Non-visible boundary feature
G	Point hydro feature
H	Linear hydro feature
I	Areal hydro feature
K	Area landmark feature

FeatureTypeCode	Feature Type
L	Point landmark feature
P	Reserved
S	Reserved
W	Pedestrian way feature

ReqID-15013   The **CensusSourceFile** sub-field SHALL be followed by a colon (:) character.

ReqID-15014   A **Source** field SHALL contain one *Source Description* statement.

ReqID-15015   The **SourceDescription** statement SHALL be in free text, describing the source file and/or a citation for the file.

ReqID-15016   A **Source** field SHALL close with an ending tag, defined per 3.1.5.1.8.3.4.4.1.

3.1.5.1.8.3.5 Quality Value Metadata Header Record

The **Quality Value** record is used to define the *Census Quality Value (CQV)* for all or part of a source used during MTAIP processing. One or more **Quality Value** fields is (are) required for each Source record.

3.1.5.1.8.3.5.1 Purpose

The **Quality Value** record defines a Census Quality Value associated with a source.

ReqID-15021   Improved TIGER data output SHALL output **Quality Value** records defining *CQVs* for every source to be used in MTAIP processing.

3.1.5.1.8.3.5.2 Obligation

The obligation of the **Quality Value** record is *Required*. One or more records will be present in the Northbound metadata for every source defined in a Source metadata record.

ReqID-15024   Improved TIGER data output SHALL output one or more metadata records containing a **Quality Value** field.

3.1.5.1.8.3.5.3 Quality Value Metadata Header Record Fixed Fields

The **RecordID** fixed field of the Quality Metadata Header Record (Table 3.1.5.1.8-2) is the **Quality ID,** and is used by other records in referencing the Quality Value.

ReqID-15027   Quality Value Metadata Header Record Fixed Fields SHALL be as defined in 3.1.5.1.8.3.1.

ReqID-15028   The **QualityID** SHALL be defined as the 10 character **RecordID** fixed field of the Quality Metadata Header Record.

3.1.5.1.8.3.5.4 Quality Value Metadata Header Record Variable Field

ReqID-15030   Quality Value Metadata Header Record Variable Fields SHALL be as defined below.

3.1.5.1.8.3.5.4.1 Tags

ReqID-15032   The tags for the *Quality Value* field SHALL be as follows:

Initial tag: <CQV>   Ending tag: </CQV>

3.1.5.1.8.3.5.4.2 Structure

ReqID-15035   The **Quality Value** field SHALL be composed of sub-fields, structured as follows:

<CQV>SourceID:QualityValue,FeatureType[:QualityValue,FeatureType]…</CQV>

3.1.5.1.8.3.5.4.3 Construction

ReqID-15038   One metadata record SHALL contain no more than one *Quality Value* field.

ReqID-15039   A *Quality Value* field SHALL open with an initial tag, defined per 3.1.5.1.8.3.5.4.1.

ReqID-15040   A *Quality Value* field SHALL contain one *SourceID* sub-field, consisting of the ten character *SourceID*, identifying the *Source* for which the quality values apply.

ReqID-15041   The *SourceID* sub-field SHALL be followed by a colon (:) character.

ReqID-15042   A *Quality Value* field SHALL contain one or more *QualityValue/FeatureType* sub-fields, defining Census Quality Values for specific feature types and feature type characteristics.

ReqID-15043   The first element of the *QualityValue/FeatureType* sub-field SHALL be the *CQV*.

ReqID-15044   The *CQV* SHALL be a variable length numeric field with a value ranging from 0 (zero) to 255, without any zero-fill.

ReqID-15045   The *CQV* SHALL represent a relative quality ranking (255 is the highest value) that applies for the defined source, feature type, and characteristic.

ReqID-15046   There SHALL be a comma (,) character after the *CQV* element.

ReqID-15047   The second element of the *QualityValue/FeatureType* sub-field SHALL be the *FeatureType*, consisting of three alphanumeric characters, composed of two items.

ReqID-15048   The first item SHALL be a one character *FeatureTypeCode*, identifying the feature type for which the *CQV* applies.

ReqID-15049   The value of the **FeatureTypeCode** SHALL be defined according to the feature types in Table 3.1.5.1.8-3.

ReqID-15050   A value of zero (0) SHALL indicate that the CQV applies to all feature types in the source.

ReqID-15051   The second item within the *FeatureType* element SHALL be a two character *FeatureCharacteristicID*, identifying the characteristic for which the CQV applies.

ReqID-15052   The value for **FeatureCharacteristicID** SHALL be defined according to the characteristics in Table 3.1.5.1.8-4.

ReqID-15053   A value of 00 (double zero) SHALL indicate that the **CQV** applies to all feature characteristics for the specified **FeatureTypeCode**.

ReqID-15054   A value of 0R (zero-R) SHALL indicate that the **CQV** applies to all remaining feature characteristics for the specified **FeatureTypeCode**, not previously defined in an earlier **FeatureType** element within the **Census Quality Value** field.

ReqID-15056   The *QualityValue/FeatureType* sub-field SHALL be repeated until all combinations of quality value, feature type, and feature characteristic have been identified for the source.

ReqID-15057   There SHALL be a colon (:) prior to every additional *QualityValue/FeatureType* sub-field.

ReqID-15058   There SHALL be no colon after the final *QualityValue/FeatureType* sub-field.

ReqID-15059   A *Quality Value* field SHALL close with an ending tag, defined per 3.1.5.1.8.3.5.4.1.

Table 3.1.5.1.8-4 List of Characteristics

ID	Characteristic	ID	Characteristic
01	Feature: Census Feature Class	25	Rail: Gauge
02	Feature: Feature Name	26	Rail: Condition of railroad grade
03	Feature: Non-Census ID	27	Rail: Mass transit rail
04	Feature: Spatial accuracy	28	Rail: Track function
05	Reserved	29	Hydro: Direction of water flow
06	Feature: Address range	30	Hydro: Internal water line
07	Feature: Zip code	31	Hydro: Shoreline
08	Feature: Stack	32	Hydro: USGS Closure line flag
09	Feature: Median width	33	Hydro: Point Special feature class
10	Feature: Feature width	34	Hydro: Area Special feature class
11	Feature: Special segment type	35	Hydro: NHD GNIS ID
12	Feature: Special feature class	36	Hydro: NHD Hydrographic category
13	Feature: Decked	37	Hydro: NHD Feature code
14	Road: Barrier to Automobile Movement	38	Hydro: NHD Reach code
15	Road: Access to road	39	Hydro: NHD Reach date
16	Road: Traffic Flow Direction	40	Landmark: City hall feature
17	Road: Jurisdiction	41	Landmark: Police station feature
18	Road: Toll Road	42	Landmark: Fire department feature
19	Road: Number of lanes	43	Landmark: Library feature
20	Road: Embedded Rail	44	Landmark: Transportation feature class
21	Road: Speed limit	45	Landmark: Government or inst. feature class
22	Road: Surface type	46	Landmark: Commercial or other feature class
23	Road: Traversable median	47	Non-visible: Geographic entity type
24	Road: Vehicular trail	48	Non-visible: Cadastral boundary type

3.1.5.1.8.3.6 Tasking Metadata Header Record

The *Tasking* record is used in Northbound MTAIP data to define an activity by which MTAIP changes were made. The record may be referenced in a *Rule* record to identify activities in which a rule applies. A *Tasking* record may refer to a broad range of action, such as in the example: "Census Bureau MTAIP Contract with Harris Corporation to improve the accuracy of the TIGER dataset." The record may also be used to refer to a more specific activity, such as in the example "Harris Corp. Census Bureau MTAIP Processing Thread 10."

3.1.5.1.8.3.6.1 Purpose

The *Tasking* record establishes an activity reference record that identifies the activity in which changes to MTAIP data are being made.

ReqID-15064   Improved TIGER data output SHALL output *Tasking* records identifying an activity in which changes to MTAIP were made.

3.1.5.1.8.3.6.2 Obligation

The Obligation for the *Tasking* record is *Required*. A *Tasking* record will be present (and referenced in a *Means* record) in the Northbound data to define the processing thread used in MTAIP production. Additional *Tasking* records will be present if necessary to define an activity for use in a *Rule* record.

ReqID-15067   Improved TIGER data output SHALL output one or more metadata records containing a *Tasking* record.

3.1.5.1.8.3.6.3 Tasking Metadata Header Record Fixed Fields

The *RecordID* fixed field of the Tasking Metadata Header Record (Table 3.1.5.1.8-2) is the *Tasking ID*, and will be used by other records in referring to the *Tasking*.

ReqID-15070   Tasking Metadata Header Record Fixed Fields SHALL be as defined in 3.1.5.1.8.3.1.

ReqID-15071   The *TaskingID* SHALL be defined as the 10 character *RecordID* fixed field of the Tasking Metadata Header Record.

3.1.5.1.8.3.6.4 Tasking Metadata Header Record Variable Field

ReqID-15073   Tasking Metadata Header Record Variable Fields SHALL be as defined below.

3.1.5.1.8.3.6.4.1 Tags

ReqID-15075   The tags for the *Tasking* field SHALL be as follows:

Initial tag: <TAS>   Ending tag: </TAS>

3.1.5.1.8.3.6.4.2 Structure

ReqID-15078   The *Tasking* field SHALL be composed of sub-fields, structured as follows:

<TAS>Description/citation</TAS>

3.1.5.1.8.3.6.4.3 Construction

ReqID-15081   A metadata record SHALL contain no more than one (1) *Tasking* field.

ReqID-15082   A *Tasking* field SHALL open with an initial tag, defined per 3.1.5.1.8.3.6.4.1.

ReqID-15083   A *Tasking* field SHALL contain one *Tasking* statement.

ReqID-15084   The *Tasking* statement SHALL be in free text, identifying a *Tasking* in which changes to MTAIP data were made.

ReqID-15085   A *Tasking* field SHALL close with an ending tag, defined per 3.1.5.1.8.3.6.4.1.

3.1.5.1.8.3.7 Means Metadata Header Record

The *Means* field is used in Northbound MTAIP data to report the means (source) for improved MTAIP data.

3.1.5.1.8.3.7.1 Purpose

The *Means* record provides a mechanism for reporting the means for improved MTAIP data. This record references all of the source, quality, authority, and rules that have a bearing on the data.

ReqID-15090   Improved TIGER data output SHALL output *Means* records identifying the means by which MTAIP data are defined.

3.1.5.1.8.3.7.2 Obligation

The Obligation for the **Means** record is *Required*. A **Means** record will be present in the Northbound data when referenced by another record in the Northbound files. The **Means** record contains required sub-fields, and may contain optional sub-fields, depending on whether the means is based on an activity, source, quality value, authority, or rule.

ReqID-15093   Improved TIGER data output SHALL output one or more metadata records containing a *Means* record.

3.1.5.1.8.3.7.3 Means Metadata Header Record Fixed Fields

The **RecordID** fixed field of the Means Metadata Header Record (Table 3.1.5.1.8-2) is the **Means ID**, also referred to as the **MID**, the Spatial MID (**SMID**), and the Attribute MID (**AMID**).

ReqID-15096   **Means** Metadata Header Record Fixed Fields SHALL be as defined in 3.1.5.1.8.3.1.

ReqID-15097   The **MeansID** SHALL be defined as the 10 character **RecordID** fixed field of the Means Metadata Header Record.

3.1.5.1.8.3.7.4 Means Metadata Header Record Variable Field

ReqID-15099   **Means** Metadata Header Record Variable Fields SHALL be as defined below.

3.1.5.1.8.3.7.4.1 Tags

ReqID-15101   The tags for the *Means* field SHALL be as follows:

Initial tag: <MEA>   Ending tag: </MEA>

3.1.5.1.8.3.7.4.2 Structure

ReqID-15104   The **Means** field SHALL be composed of sub-fields, structured as follows:

<MEA>TaskingID,SourceID,QualityID,[QualityID,]AuthorityID,[RuleID,]</MEA>

3.1.5.1.8.3.7.4.3 Construction

ReqID-15107   One metadata record SHALL contain no more than one **Means** field.

ReqID-15108   A **Means** field SHALL open with an initial tag, defined per 3.1.5.1.8.3.7.4.1.

ReqID-15109   A **Means** field SHALL contain one **Tasking** sub-field, if the referenced **Tasking** was relevant in determining the information for which the **Means** field provides a basis.

ReqID-15110   The **Tasking** sub-field SHALL consist of the following:

TaskingID   (a ten digit identifier for a **Tasking**, per 3.1.5.1.8.3.6)

ReqID-15112   The **Tasking** sub-field SHALL be followed by a comma (,) character.

ReqID-15113   A **Means** field SHALL contain one **Source** sub-field, identifying the *Source* relevant in determining the information for which the **Means** field provides a basis.

ReqID-15114   The **Source** sub-field SHALL consist of the following:

SourceID   (a ten digit identifier for a *Source*, per 3.1.5.1.8.3.4)

ReqID-15116   The **Source** sub-field SHALL be followed by a comma (,) character.

ReqID-15117   A **Means** field SHALL contain one or more **Quality** sub-fields, identifying one or more *Quality values* relevant in determining the information for which the **Means** field provides a basis.

ReqID-15118   Each *Quality* sub-field SHALL consist of the following:

        QualityID   (a ten digit identifier for a *QualityValue*, per 3.1.5.1.8.3.5)

ReqID-15120   The *Quality* sub-field SHALL be followed by a comma (,) character.

ReqID-15121   A *Means* field SHALL contain one or more *Authority* sub-fields, identifying an *Authority* relevant in determining the information for which the *Means* field provides a basis.

ReqID-15122   Each *Authority* sub-field SHALL consist of the following:

        AuthorityID   (a ten digit identifier for an *Authority*, per 3.1.5.1.8.3.3)

ReqID-15124   The *Authority* sub-field SHALL be followed by a comma (,) character, unless the sub-field is the final element prior to the ending tag.

ReqID-15125   A *Means* field SHALL contain zero or more *Rule* sub-fields, identifying a *Rule* relevant in determining the information for which the *Means* field provides a basis.

ReqID-15126   Each *Rule* sub-field SHALL consist of the following:

        RuleID   (a ten digit identifier for a *Rule*, per 3.1.5.1.8.3.4)

ReqID-15128   The *Rule* sub-field SHALL be followed by a comma (,) character, unless the sub-field is the final element prior to the ending tag.

ReqID-15129   A *Means* field SHALL close with an ending tag, defined per 3.1.5.1.8.3.7.4.1.

3.1.5.1.8.3.8 Definition of the Comment Field

The *Comment* field is used to convey additional information for which no specific tag exists.

3.1.5.1.8.3.8.1 Purpose

The *Comment* field conveys information for which no tag exists. Comments are informative only and do not have the force of a requirement.

ReqID-15134   Improved TIGER data output SHALL output *Comment* fields containing free text information.

3.1.5.1.8.3.8.2 Obligation

The Obligation for the *Comment* field is *Optional*. When present, the Comment field is appended to the end of another header record.

ReqID-15137   Improved TIGER data output SHALL output zero or one Comment fields, when necessary to provide additional information about a header metadata record.

3.1.5.1.8.3.8.3 Tags

ReqID-15139   The tags for the *Comment* field SHALL be as follows:

        Initial tag: <CMT>   Ending tag: </CMT>

3.1.5.1.8.3.8.4 Structure

ReqID-15142   The *Comment* field SHALL be structured as follows:

    <CMT>Comment</CMT>

3.1.5.1.8.3.8.5 Construction

ReqID-15145   One metadata record SHALL contain no more than one *Comment* field.

ReqID-15146   A *Comment* field SHALL open with an initial tag, defined per 3.1.5.1.8.3.8.3.

ReqID-15147   A *Comment* field SHALL consist of an alphanumeric string of up to 1000 characters.

ReqID-15148   A *Comment* field SHALL close with an ending tag defined per 3.1.5.1.8.3.8.3.

3.1.5.1.8.4 Metadata Transaction Record Format

Each Northbound metadata transaction record contains six fixed length fields and one or more variable length field. The fixed fields are defined in 3.1.5.1.8.4.1, and are the same for all types of metadata transaction records. The variable field defines specific actions and conditions associated with the Northbound MTAIP data, and is defined in 3.1.5.1.8.3.2 – 3.1.5.1.8.3.8. The structure of the variable fields consists of three parts: an initial tag, the metadata record content, and an ending tag.

ReqID-15151   Improved TIGER data output SHALL output Northbound metadata transaction records as defined herein.

3.1.5.1.8.4.1 Transaction Record Fixed Field Layout and Data Element Description

ReqID-11371   The Record Layout for the Fixed Field portion of **Metadata Transaction** records SHALL be as identified in Table 3.1.3.1.8-5.

Table 3.1.5.1.8-5 Record Layout for Fixed Field of Metadata Transaction Record

Description	Field	BV	Fmt	Type	Beg	End	Len
Record type	RT	No	L	A	1	1	1
Record ID	RECID	No	R	N	2	11	10
Activity date	ADATE	No	R	N	12	17	6
Action code	FACTION	No	L	A	18	18	1
Condition code	FCONDITION	No	L	A	19	19	1
Activity ID	ACTIVITY	No	L	A	20	29	10

ReqID-15155   The 17 character combined *Record type*, *Record ID*, and *Date* SHALL be defined as the *Metadata ID*.

ReqID-15156   The *Metadata ID* SHALL be the foreign key by which all other Northbound record types refer to the applicable **Metadata** record.

ReqID-9384   Improved TIGER data output SHALL output *Fixed Field* data elements as defined below.

ReqID-9385   The *Record type* SHALL be a one character value identifying the type of **Metadata** record, as follows:

    1 = The metadata record is a Transaction record for a linear feature returned in the **Spatial File for Linear Features** (ref. 3.1.5.1.2.3.1).

    2 = The metadata record is a Transaction record for a geographic entity returned in the **Spatial File for Geographic Entities** (rev. 3.1.5.1.2.3.2).

    3 = The metadata record is a Transaction record for an areal feature returned in the **Spatial File for Areal Features** (ref. 3.1.5.1.2.3.3).

    4 = The metadata record is a Transaction record for a point feature returned in the **Spatial File for Point Features** (ref. 3.1.5.1.2.3.4).

    R = The metadata record is a Transaction record for a feature that was in the Southbound MTAIP files, but was removed during processing, and not returned in the Northbound spatial files.

ReqID-15164   The *Record ID* SHALL be the HID of the feature for which the metadata record is providing transaction information (When Record type equals 1, 2, 3, and 4).

ReqID-15165   The *Record ID* SHALL be a unique number for which the metadata record is providing transaction information (When Record type equals R).

ReqID-15166   The *Record ID* SHALL be right justified and zero-filled in order to fill the 10 digit field.

ReqID-9388   The *Date* SHALL refer to the date the file was created (YYMMDD format).

ReqID-15168   When the specific month or day is not known, the value for the unknown element SHALL be 00 (zero zero).

ReqID-9389   The *Action Code* SHALL refer to the action taken on the feature during MTAIP processing.

ReqID-9390   An *Action Code* SHALL apply to an entire record.

ReqID-9392   Values for *Action Codes* SHALL be one of the characters defined below:

A = Add; denotes a new feature, not present in the Southbound MTAIP files.

-   Valid for linear features

-   Required for geographic entities, areas, and points in NB 2, 3, and 4, not correlated to entities, areas, and points in the SB files (RT G, K, L, and 0).

-   Requires *Condition Code* value of X.

R = Removed; denotes a feature that was present in the Southbound MTAIP files but has been physically removed from Northbound MTAIP linear network according to the rules of this specification.

-   Valid for linear features only.

-   Requires *Condition Code* value of N.

(When a feature has been removed because of a topology add/remove situation, an *Action Code* of T is used instead of R.)

N = Visible feature – not found; denotes a feature that the Southbound MTAIP files classified as a visible feature but which was not found in the source material that should have contained a matching feature of that type.

-   Valid for linear features only.

-   Requires *Condition Code* value of N.

Z = Visible feature – source not present; denotes a feature that the Southbound MTAIP file classifies as a visible feature but is not present in the source material due to the nature of the source.

-   Valid for linear features only.

-   Requires *Condition Code* value of X.

For example, when a TSC&L GIS source file only contains road features, only road features can be matched (*Action code* = C, S, or F) or not-matched (*Action Code* = N). Visible features not present in the source data would have an *Action code* of Z.

V = Non-visible feature – not found or source not present; denotes a feature that the Southbound MTAIP files classified as a non-visible feature. No matching feature is present in the source material.

- Valid for linear features only.

- Requires *Condition Code* value of X.

T = Topological Add-Delete; denotes a feature that was present in the Southbound MTAIP files and was found in the source material, but whose coordinate adjustment would create topological conflicts.

- Valid for linear features only.

- Required in a topology add/remove situation, whether 1) the feature is physically removed from the NB files, or 2) the feature is returned with a NB-5 *Line delete flag* of M.

- Requires *Condition Code* value of N.

C = Feature Matched; action taken on spatial data and attribute data.

- Valid for linear features only.

- Requires *Condition Code* value of M.

S = Feature Matched; action taken on spatial data only.

- Valid for linear features only.

- Requires *Condition Code* value of M.

F = Feature Matched; action taken on attribute data only.

- Valid for linear features

- Required for geographic entities, areas, and points in NB 2, 3, and 4 that are correlated to SB entities, areas, and points (RT G, L, K, and 0).

- Requires *Condition Code* value of M.

X = No action taken on this record. All parts of this record remain unchanged.

- Valid for linear features

- Required for geographic entities, areas, and points in SB files (RT G, L, and K), but not correlated with objects in NB 2, 3, and 4.

- Requires *Condition Code* value of X or G.

ReqID-9406   The *Condition code* SHALL refer to the relationship that exists between the TIGER feature and the information in the source material that formed the basis for the action taken.

ReqID-9407   Values for *Condition code* SHALL be one of the characters defined below:

M = Match made between an existing TIGER feature and the source material.

N = No match was made between the existing feature and the source material.

X = Condition code not applicable to the action. (Example: When ACTION = A or is a header record)

G = Changes are not allowed to the TIGER feature for whatever reason; it is GOLDEN for this activity. This FCONDITION can only be assigned or removed by the Census Bureau. ACTION code must be an X. Only comments are allowed.

ReqID-9411   The *Activity ID* SHALL be used to identify the organization responsible for the adjustment or update activity.

ReqID-9412   The following *Activity ID*s SHALL be used: "HarrisCorp".

3.1.5.1.8.4.2 Variable Fields

3.1.5.1.8.4.2.1 General Obligation and Structure

The obligation for these fields in each record is either conditional or optional. If a field is conditional and the condition is met by either a specific direction of the Census Bureau, codes in the fixed fields, or the purpose of the record, then the variable field becomes mandatory.

To identify the fields when added to the fixed part of the record, they are 'tagged' with a unique start and stop tag enclosed within greater than and less than symbols (somewhat similar to an HTML or XML tag). If a pair of tags occurs in a metadata record, it must contain the specified content, i.e., empty tag fields are not allowed.

Fields may have more than one value. In this case, the values are delimited as described by the construction rules for those tags.

3.1.5.1.8.4.2.2 FROM Endpoint Field

3.1.5.1.8.4.2.2.1 Purpose

The *FROM endpoint field* provides notice that the FROM endpoint of a linear feature was adjusted, and provides the MID for that adjustment.

ReqID-15198   Improved TIGER data output SHALL output the *FROM endpoint field* to identify when the FROM endpoint of a linear feature was adjusted during MTAIP processing.

3.1.5.1.8.4.2.2.2 Obligation

The obligation for the *FROM endpoint field* is conditional.

ReqID-15201   The field SHALL be returned when the Action code is one of the following, only when the FROM endpoint has been added or adjusted.

A = Add

N = Not found; proportionally moved

Z = Feature type not present; proportionally moved

V = Non visible feature; proportionally moved

C = Feature matched; action taken on spatial data and attribute data

S = Feature matched; action taken on spatial data only

3.1.5.1.8.4.2.2.3 Tags

ReqID-15209   The tags for the *FROM endpoint field* SHALL be as follows:

Initial tag: <FEF>   Ending tag:</FEF>

3.1.5.1.8.4.2.2.4 Structure

ReqID-15212   The **FROM endpoint field** SHALL be structured as follows:

           <FEF>SMID</FEF>

3.1.5.1.8.4.2.2.5 Construction

ReqID-15215   A transaction metadata record SHALL contain no more than one **FROM endpoint field**.

ReqID-15216   A **FROM endpoint field** SHALL open with an initial tag, defined per 3.1.5.1.8.4.2.2.3.

ReqID-15217   A **FROM endpoint field** SHALL contain a Spatial Means ID sub-field, identifying the means of the spatial basis for adjusting the FROM endpoint.

ReqID-15218   A Spatial Means ID sub-field SHALL consist of the following:

            MeansID   (a ten digit identifier for a *Spatial means*, per 3.1.5.1.8.3.6)

ReqID-15220   A **FROM endpoint field** SHALL close with an ending tag, defined per 3.1.5.1.8.4.2.2.3.

3.1.5.1.8.4.2.3 TO Endpoint Field

3.1.5.1.8.4.2.3.1 Purpose

The **TO endpoint field** provides notice that the TO endpoint of a linear feature was adjusted, and provides the MID for that adjustment.

ReqID-15224   Improved TIGER data output SHALL output the **TO endpoint field** to identify when the TO endpoint of a linear feature was adjusted during MTAIP processing.

3.1.5.1.8.4.2.3.2 Obligation

The obligation for the **TO endpoint field** is conditional.

ReqID-15227   The field SHALL be returned when the Action code is one of the following, only when the TO endpoint has been added or adjusted.

        A = Add

        N = Not found; proportionally moved

        Z = Feature type not present; proportionally moved

        V = Non visible feature; proportionally moved

        C = Feature matched; action taken on spatial data and attribute data

        S = Feature matched; action taken on spatial data only

3.1.5.1.8.4.2.3.3 Tags

ReqID-15235   The tags for the **TO endpoint field** SHALL be as follows:

        Initial tag: <TEF>   Ending tag:</TEF>

3.1.5.1.8.4.2.3.4 Structure

ReqID-15238   The **TO endpoint field** SHALL be structured as follows:

           <TEF>SMID</TEF>

3.1.5.1.8.4.2.3.5 Construction

ReqID-15241   A transaction metadata record SHALL contain no more than one **TO endpoint field**.

ReqID-15242   A ***TO endpoint field*** SHALL open with an initial tag, defined per 3.1.5.1.8.4.2.3.3.

ReqID-15243   A ***TO endpoint field*** SHALL contain a Spatial Means ID sub-field, identifying the means of the spatial basis for adjusting the TO endpoint.

ReqID-15244   A Spatial Means ID sub-field SHALL consist of the following:

> ***MeansID***   (a ten digit identifier for a *Spatial means*, per 3.1.5.1.8.3.6)

ReqID-15246   A ***TO endpoint field*** SHALL close with an ending tag, defined per 3.1.5.1.8.4.2.3.3.

3.1.5.1.8.4.2.4 Shape Point Field

3.1.5.1.8.4.2.4.1 Purpose

The ***Shape point field*** provides notice that shape points of a linear feature were adjusted, and provides the MID for that adjustment.

ReqID-15250   Improved TIGER data output SHALL output the ***Shape point field*** to identify when the shape points of a linear feature was adjusted during MTAIP processing.

3.1.5.1.8.4.2.4.2 Obligation

The obligation for the ***Shape point field*** is conditional.

ReqID-15253   The field SHALL be returned when the Action code is one of the following, only when shape points have been added or adjusted.

> A = Add
>
> N = Not found; proportionally moved
>
> Z = Feature type not present; proportionally moved
>
> V = Non visible feature; proportionally moved
>
> C = Feature matched; action taken on spatial data and attribute data
>
> S = Feature matched; action taken on spatial data only

3.1.5.1.8.4.2.4.3 Tags

ReqID-15261   The tags for the ***Shape point field*** SHALL be as follows:

> Initial tag: <SPF>   Ending tag:</SPF>

3.1.5.1.8.4.2.4.4 Structure

ReqID-15264   The ***Shape point field*** SHALL be structured as follows:

> <SPF>SMID</SPF>

3.1.5.1.8.4.2.4.5 Construction

ReqID-15267   A transaction metadata record SHALL contain no more than one ***Shape point field***.

ReqID-15268   A ***Shape point field*** SHALL open with an initial tag, defined per 3.1.5.1.8.4.2.4.3.

ReqID-15269   A ***Shape point field*** SHALL contain a Spatial Means ID sub-field, identifying the means of the spatial basis for adjusting the shape point(s).

ReqID-15270   A Spatial Means ID sub-field SHALL consist of the following:

> ***MeansID***   (a ten digit identifier for a *Spatial means*, per 3.1.5.1.8.3.6)

ReqID-15272   A ***Shape point field*** SHALL close with an ending tag, defined per 3.1.5.1.8.4.2.4.3.

3.1.5.1.8.4.2.5 Attribute Conflation Association Field

The ***Attribute conflation association*** field (ACF) serves to establish a relationship between Southbound TIGER linear features and a new feature added during MTAIP processing under special conditions. The TIGER features appear in the source material, but cannot be "matched" to the source without creating a topological violation. Therefore, a new feature is added and the ACF field allows the linking of the TIGER attributes to the added feature. The association established by this field allows for the transfer of selected non-coordinate attributes between the old TIGER feature(s) and the added one. This variable field is the mechanism by which changed unmatched linear features are reported in the metadata (ref. 3.1.4.1.1.2.3).

3.1.5.1.8.4.2.5.1 Purpose

The ***Attribute conflation association*** field establishes a relationship between one or more existing TIGER linear features (that could not be matched to source because of topology issues) and a new feature. The ***Attribute conflation association*** field provides information to be used by the Census Bureau to transfer TIGER attributes during upload.

ReqID-15277   Improved TIGER data output SHALL output the ***Attribute conflation association*** variable field to establish a relationship between one or more existing TIGER features and a new feature added to preserve TIGER topology.

3.1.5.1.8.4.2.5.2 Obligation

The obligation for the ***Attribute conflation association*** field is Conditional.

ReqID-15280   The ***Attribute conflation association*** field SHALL be returned in the Northbound metadata when the following three conditions are met:

1. A match has been made between a feature in the source material and one or more features in the TIGER data.

2. Coordinate adjustment of the TIGER feature(s), based on the match to the source, would create a topological violation.

3. A new record has been added from the source, but without full attribution.

3.1.5.1.8.4.2.5.3 Tags

ReqID-15285   The tags for the ***Attribute conflation association*** field SHALL be as follows:

Initial tag: <ACF>   Ending tag:</ACF>

3.1.5.1.8.4.2.5.4 Structure

ReqID-15288   The ***Attribute conflation association*** field SHALL be composed of one or more pairs of values, the Spatial Means ID and the Southbound Record ID for the linear feature (the TLID):

<ACF>SMID:RT1_RecordID[,SMID:RT1_RecordID]</ACF>

3.1.5.1.8.4.2.5.5 Construction

ReqID-15291   A metadata record SHALL contain no more than one ***Attribute conflation association*** field.

ReqID-15292   The ***Attribute conflation association*** field SHALL be present only in the metadata record for an added linear feature (Record type = 1; Action code = A; Condition code = X).

ReqID-15293   An ***Attribute conflation association*** field SHALL open with an initial tag, defined per 3.1.5.1.8.4.2.5.3.

ReqID-15970   An ***Attribute conflation association*** field SHALL contain one or more pairs of **SMID** and ***RT-1_RecordID*** subfields, as described below:

ReqID-15294   The **SMID** sub-field SHALL consist of the 10 character ***Spatial Means ID*** identifying the means of the spatial match to the source.

ReqID-15295   The **SMID** sub-field SHALL be followed by a colon (:) character.

ReqID-15297   The ***RT-1_RecordID*** sub-field SHALL be the 10 digit Record ID (the TLID) of the Southbound linear feature associated with the added feature.

ReqID-15971   Additional pairs of **SMID** and ***RT-1_RecordID*** subfields, if any, SHALL follow the first pair, delimited by a comma (,) character.

ReqID-15298   An ***Attribute conflation association*** field SHALL close with an ending tag, defined per 3.1.5.1.8.4.2.5.3.

3.1.5.1.8.4.2.6   Topological Violation Field

3.1.5.1.8.4.2.6.1   Purpose

ReqID-15301   The ***Topological violation field*** is used to report a topological violation that was created when a Type-1 record was adjusted, creating a violation beyond the authority or capability of the activity doing the work to correct. Note, violations in both directions must be reported, i.e., this field SHALL appear in the metadata for each record involved.

ReqID-15302   Improved TIGER data output SHALL output the ***Topological violation field*** to report a condition of topological violation that cannot be resolved by the contractor.

3.1.5.1.8.4.2.6.2   Obligation

The obligation for the ***Topological violation field*** is Conditional.

ReqID-15305   The ***Topological violation field*** SHALL not be used to report a boundary topology violation.

ReqID-15306   The ***Topological violation field*** SHALL be returned in the Northbound metadata when either of the following two conditions are met:

1. A feature was not matched, but coordinate adjustment created a topological violation or,

2. A feature was matched, but the source material directed for use caused a topological error for this feature.

3.1.5.1.8.4.2.6.3   Tags

ReqID-15310   The tags for the ***Topological violation field*** SHALL be as follows:

Initial tag: <TVF>   Ending tag:</TVF>

3.1.5.1.8.4.2.6.4   Structure

ReqID-15313   The ***Topological violation field*** SHALL be composed of references to one or more linear HIDs causing the topological violation with this record. The field consists of either the key word SELF or a list of one or more other records involved in the topological violation with this record:

<TVF>SELF or HID[:HID]</TVF>

3.1.5.1.8.4.2.6.5 Construction

ReqID-15316   A metadata record SHALL contain no more than one **Topological violation field**.

ReqID-15317   A **Topological violation field** SHALL open with an initial tag, defined per 3.1.5.1.8.4.2.6.3.

ReqID-15318   A **Topological violation field** SHALL contain one or more **RecordID** sub-fields.

ReqID-15319   If the topological violation involves only this one linear HID (e.g., a self crossing feature), then the **RecordID** sub-field SHALL consist of the text SELF, which is followed by the ending tag.

ReqID-15320   If the topological violation involves one or more HIDs in violation with the subject feature, then the HID of every violating feature SHALL be listed.

ReqID-15321   Multiple HIDs SHALL be separated by a colon (:) character.

ReqID-15322   A **Topological violation field** SHALL close with an ending tag, defined per 3.1.5.1.8.4.2.6.3.

3.1.5.1.8.4.2.7 Boundary Topology Violation Field

3.1.5.1.8.4.2.7.1 Purpose

The **Boundary topology violation field** is used to report a topology violation between a county boundary segment and a linear feature which, when matched to source, created a topology violation beyond the authority of the contractor. Since the Census Bureau's partitioning of TIGER data depends heavily upon county boundaries, this is an important topological violation and is singled out for separate reporting.

ReqID-15326   Improved TIGER data output SHALL output the **Boundary topology violation field** to report a condition of boundary topological violation that cannot be resolved by the contractor.

3.1.5.1.8.4.2.7.2 Obligation

The obligation for the **Boundary topology violation field** is Conditional.

ReqID-15329   The **Boundary topology violation field** SHALL be used to report a boundary topology violation.

ReqID-15330   The **Boundary topology violation field** SHALL be returned in the Northbound metadata when a linear feature is added or adjusted causing a topological violation with a county partition boundary.

3.1.5.1.8.4.2.7.3 Tags

ReqID-15332   The tags for the **Boundary topology violation field** SHALL be as follows:

Initial tag: <BTV>   Ending tag:</BTV>

3.1.5.1.8.4.2.7.4 Structure

ReqID-15335   The **Boundary topology violation field** SHALL be composed of references to one or more linear HIDs causing the topological violation with this record. The field also defines the action taken on the HID causing the violation:

<BTV>HID:SMID:BACTION[:SMID:HID:BACTION]</BTV>

3.1.5.1.8.4.2.7.5 Construction

ReqID-15338   A metadata record SHALL contain no more than one ***Boundary topology violation field***.

ReqID-15339   A ***Boundary topology violation field*** SHALL open with an initial tag, defined per 3.1.5.1.8.4.2.7.3.

ReqID-15340   A Boundary topology violation field SHALL contain one or more Violation sub-fields.

ReqID-15341   The ***Violation*** sub-field SHALL consist of the ten character ***RecordID*** (the HID) of the offending linear feature.

ReqID-15342   The ***RecordID*** SHALL be followed by a colon (:) character.

ReqID-15343   The ***Violation*** sub-field SHALL contain the ten character ***Spatial MID*** of the offending linear feature.

ReqID-15344   The ***Spatial MID*** SHALL be followed by a colon (:) character.

ReqID-15345   The ***Violation*** sub-field SHALL contain a ***BACTION*** code, defined as follows:

> N = the offending linear feature was adjusted and now conflicts with a non-visible or non-matched record forming a portion of the county boundary whose end and shape points were proportionally adjusted.

> M = the offending linear feature was adjusted and now conflicts with a matched record that forms a portion of the county boundary.

> A = the offending linear feature was added and now conflicts with a non-visible or non-matched record forming a portion of the county boundary whose end and shape points were proportionally adjusted.

> B = the offending linear feature was added and now conflicts with a matched record that forms a portion of the county boundary.

ReqID-15350   If the boundary topological violation involves more than one linear feature, one or more additional ***Violation*** sub-fields SHALL follow the first.

ReqID-15351   Multiple ***Violation*** sub-fields SHALL be separated by a colon (:) character.

ReqID-15352   A ***Boundary topology violation field*** SHALL close with an ending tag, defined per 3.1.5.1.8.4.2.7.3.

3.1.5.1.8.4.2.8 Southbound ID Field

3.1.5.1.8.4.2.8.1 Purpose

The ***Southbound ID (SID) field*** provides a link to the Southbound Record key for all deleted features and all HID features in the Northbound data, with the exception of features added during MTAIP processing. Every feature provided in the Southbound data will appear at least once in a ***SID*** field.

ReqID-15356   TIGER data output SHALL output a ***SID field*** identifying the Record key of the associated Southbound feature.

3.1.5.1.8.4.2.8.2 Obligation

The obligation for the ***SID field*** is conditional. It is required for all Metadata transaction records for HIDs that have an associated feature in the Southbound data (all non-adds).

ReqID-15359   The ***SID field*** SHALL be returned in every Metadata transaction record with the following action codes:

R = Removed

N = Not found

Z = Visible feature not present in the source material

V = Non-visible feature

T = Topological add-delete

C = Feature Matched; action taken on spatial data and attribute data

S = Feature Matched; action taken on spatial data only

F = Feature Matched; action taken on attribute data only

X = No action taken on this record

3.1.5.1.8.4.2.8.3 Tags

ReqID-15370   The tags for the **SID field** SHALL be as follows:

Initial tag: <SID>   Ending tag:</SID>

3.1.5.1.8.4.2.8.4 Structure

The Southbound **Record key** is defined generically in 3.1.1.1.4. Specific references to the **Record key** are in 3.1.1.3.3 (RT-1) for linear features, 3.1.1.6.3 (RT-G) for geographic entities, 3.1.1.7.3 (RT-K) for area features, and 3.1.1.8.3 (RT-L) for point features.

ReqID-15374   The **SID field** SHALL be composed of the **Record key** of the Southbound feature (ref. 3.1.1.1.4):

<SID>Southbound Record key</SID>

3.1.5.1.8.4.2.8.5 Construction

ReqID-15377   A metadata record SHALL contain no more than one **SID field**.

ReqID-15378   A **SID field** SHALL open with an initial tag, defined per 3.1.5.1.8.4.2.8.3.

ReqID-15379   A **SID field** SHALL contain the 17 character **Record key** of the Southbound feature.

ReqID-15380   A **SID field** SHALL close with an ending tag, defined per 3.1.5.1.8.4.2.8.3.

3.1.5.1.8.4.2.9 CFCC Data Field

3.1.5.1.8.4.2.9.1 Purpose

The **CFCC data field** provides a mechanism to report changes to the CFCC fields in any type record.

ReqID-15384   TIGER data output SHALL output a CFCC data field when necessary to report changes to the Census Feature Class of a feature.

3.1.5.1.8.4.2.9.2 Obligation

The obligation for the **CFCC data field** is *Conditional*.

ReqID-15387   The field SHALL be used when reporting any change to the CFCC of a feature provided in the Southbound MTAIP data.

ReqID-15388   The field SHALL be returned only when the Action code is one of the following:

T = Topological Add/Delete

C = Feature matched; action taken on spatial data and attribute data

F = Feature matched; action taken on attribute data only

3.1.5.1.8.4.2.9.3 Tags

ReqID-15393 The tags for the **CFCC data field** SHALL be as follows:

Initial tag: <CFC> Ending tag:</CFC>

3.1.5.1.8.4.2.9.4 Structure

ReqID-15396 The **CFCC data field** SHALL be composed of a non-repeating pair of values, the Means ID for the source identifying the CFC of the feature and the one character alpha value of the old CFC (the new CFC would have been provided in the Northbound Linear Feature Spatial Table for linear features, or the Geographic Entities Attribute Table, Areal Feature Attribute Table, or Point Feature Attribute Table, for entities, areas, and points, respectively):

<CFC>MEANSID:Old_CFC</CFC>

3.1.5.1.8.4.2.9.5 Construction

ReqID-15399 A metadata record SHALL contain no more than one **CFCC data field**.

ReqID-15400 A **CFCC data field** SHALL open with an initial tag, defined per 3.1.5.1.8.4.2.9.3.

ReqID-15401 A **CFCC data field** SHALL contain a 10 character Means ID (MID) sub-field, identifying the means of the match to the source.

ReqID-15402 The **MeansID** sub-field SHALL be followed by a colon (:) character.

ReqID-15403 A **CFCC data field** SHALL contain a one character CFC identifying the feature class of the Southbound feature.

ReqID-15404 A **CFCC data field** SHALL close with an ending tag, defined per 3.1.5.1.8.4.2.9.3.

3.1.5.1.8.4.2.10 Comment Field

The **Comment** field is used to convey additional information for which no specific tag exists.

3.1.5.1.8.4.2.10.1 Purpose

The **Comment** field conveys information for which no tag exists. Comments are informative only and do not have the force of a requirement.

ReqID-15409 Improved TIGER data output SHALL output **Comment** fields containing free text information.

3.1.5.1.8.4.2.10.2 Obligation

The *Obligation* for the **Comment** field is Optional. When present, the **Comment** field is appended to the end of another header record.

ReqID-15412 Improved TIGER data output SHALL output zero or one **Comment** fields, when necessary to provide additional information about a header metadata record.

3.1.5.1.8.4.2.10.3 Tags

ReqID-15414 The tags for the *Comment* field SHALL be as follows:

Initial tag: <CMT> Ending tag: </CMT>

3.1.5.1.8.4.2.10.4 Structure

ReqID-15417   The *Comment* field SHALL be structured as follows:

> <CMT>Comment</CMT>

3.1.5.1.8.4.2.10.5 Construction

ReqID-15420   One metadata record SHALL contain no more than one *Comment* field.

ReqID-15421   A *Comment* field SHALL open with an initial tag, defined per 3.1.5.1.8.4.2.10.3.

ReqID-15422   A *Comment* field SHALL consist of an alphanumeric string of up to 1000 characters.

ReqID-15423   A *Comment* field SHALL close with an ending tag defined per 3.1.5.1.8.4.2.10.3.

3.1.5.2 County Border Data

3.1.5.2.1 Zero-Cell Matching Record

The Zero-Cell Matching record provides the association between county border 0-cells, as represented in the subject county and each adjacent county.

During edge matching, the 0-cell in the subject county will either remain in place or will be adjusted to the adjacent county's 0-cell, based on the relative CQVs of matching 0-cells. The **Zero-Cell Matching** record provides the Census Bureau with information to use during upload to either adjust the associated 0-cell in the adjacent county to the 0-cell in the subject county, or simply upload the improved 0-cell in the subject county.

ReqID-2575   Data output SHALL define a border 0-cell as a node that exists on the borderline between two or more counties.

3.1.5.2.1.1 Purpose

ReqID-13350   Data output SHALL output a **Zero-Cell Matching** file, providing a match between subject county border 0-cells and the corresponding 0-cells in adjacent counties.

ReqID-13351   Data output SHALL output a single **Zero-Cell Matching** file for a subject county, which will include matches with one or more adjacent counties.

ReqID-13352   Data output SHALL output a **Zero-Cell Matching** record for every border 0-cell in the subject county that has a corresponding 0-cell in an adjacent county.

ReqID-13353   Zero-cells at the corner of a subject county and two or more adjacent counties SHALL have one **Zero-Cell Matching** record for every adjacent county 0-cell (paired with the subject county 0-cell).

3.1.5.2.1.2 Record Format

ReqID-13340   The file SHALL consist of multiple Zero-Cell Matching records, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-7210   The record layout for the Zero-Cell Matching record SHALL be as defined in Table 3.1.5.2-1.

3.1.5.2.1.3 Data Element Dictionary

ReqID-15937   Data output SHALL generate **Zero-Cell Matching** data elements, as identified in this section.

ReqID-15938   The *Record Type* SHALL be the letter A.

ReqID-15939   The *State FIPS code for subject county* SHALL identify the two-digit state or equivalent
entity FIPS 5 code for the subject county's state (as specified in the Federal Information
Processing Standards).

ReqID-15940   The *County FIPS code for subject county* SHALL identify the three-digit county or
equivalent entity FIPS 6 code for the subject county (as specified in the Federal
Information Processing Standards).

Table 3.1.5.2-1 Record Layout for the Zero-Cell Matching File

Description	Field	BV	Fmt	Type	Beg	End	Len
Record Type	RT	No	L	A	1	1	1
FIPS state code for subject county	SUBJ_ST	No	R	N	2	3	2
FIPS county code for subject county	SUBJ_CO	No	R	N	4	6	3
TZID within subject county	SUBJ_TZID	No	R	N	7	16	10
FIPS state code for adjacent county	ADJ_ST	No	R	N	17	18	2
FIPS county code for adjacent county	ADJ_CO	No	R	N	19	21	3
TZID within adjacent county	ADJ_TZID	No	R	N	22	31	10
Higher CQV flag	CQV_FLAG	No	R	N	32	32	1

ReqID-15941   The *TZID within subject county* SHALL be the TZID for a border 0-cell in the subject
county, as identified in the Southbound **RT-0** for the subject county.

ReqID-15942   The *State FIPS code for adjacent county* SHALL identify the two-digit state or
equivalent entity FIPS 5 code for the subject county's state (as specified in the Federal
Information Processing Standards).

ReqID-15943   The *County FIPS code for adjacent county* SHALL identify the three-digit county or
equivalent entity FIPS 6 code for the subject county (as specified in the Federal
Information Processing Standards).

ReqID-15944   The *TZID within adjacent county* SHALL be the TZID for the matching border 0-cell in
an adjacent county, as identified per 3.1.3.5 (and as identified in the Southbound **RT-0**
for the adjacent county; ref. 3.1.1.2.3).

ReqID-15945   Higher CQV flag SHALL indicate which 0-cell had the higher CQV.

ReqID-15946   A value of 1 (one) SHALL indicate that the 0-cell of the subject county had the higher
CQV.

ReqID-15947   A value of 2 SHALL indicate that the 0-cell of the adjacent county had the higher CQV.

3.1.5.2.2 One-Cell Matching Record

The **One-Cell Matching** record provides the association between county border 1-cells, as represented in
the subject county and each adjacent county.

During edge matching, the 1-cell in the subject county will either remain in place or will be adjusted to
the adjacent county's 1-cell, based on the relative CQVs of matching 1-cells.. The **One-Cell Matching**
record provides the Census Bureau with information to use during upload to either adjust the associated 1-
cell in the adjacent county to the 1-cell in the subject county, or simply upload the improved 1-cell in the
subject county.

3.1.5.2.2.1 Purpose

ReqID-13345   Data output SHALL output a **One-Cell Matching** file, providing matching between subject county border 1-cells and the corresponding 1-cells in adjacent counties.

ReqID-2574   Data output SHALL define a border 1-cell that forms a portion of the border of the subject county as a border 1-cell.

ReqID-13348   Data output SHALL output a single **One-Cell Matching** file for the subject county, which will include matches with one or more adjacent counties.

ReqID-13346   Data output SHALL output a **One-Cell Matching** record for every border 1-cell in the subject county that has a corresponding 1-cell in an adjacent county.

3.1.5.2.2.2 Record Format

ReqID-13337   The file SHALL consist of multiple **One-Cell Matching** records, delimited by a <NL> (New Line; ISO 8859-1 decimal value 10).

ReqID-7277   The record layout for the **One-Cell Matching** record SHALL be as defined in Table 3.1.5.2-2.

Table 3.1.5.2-2 Record Layout for the One-Cell Matching File

Description	Field	BV	Fmt	Type	Beg	End	Len
Record Type	RT	No	L	A	1	1	1
FIPS state code for subject county	SUBJ_ST	No	R	N	2	3	2
FIPS county code for subject county	SUBJ_CO	No	R	N	4	6	3
TZID within subject county	SUBJ_TZID	No	R	N	7	16	10
FIPS state code for adjacent county	ADJ_ST	No	R	N	17	18	2
FIPS county code for adjacent county	ADJ_CO	No	R	N	19	21	3
TZID within adjacent county	ADJ_TZID	No	R	N	22	31	10
Higher CQV flag	CQV_FLAG	No	R	N	32	32	1

3.1.5.2.2.3 Data Element Dictionary

ReqID-15925   Data output SHALL generate **One-Cell Matching** data elements, as identified in this section.

ReqID-15926   The *Record Type* SHALL be the letter B.

ReqID-15927   The *State FIPS code for subject county* SHALL identify the two-digit state or equivalent entity FIPS 5 code for the subject county's state (as specified in the Federal Information Processing Standards).

ReqID-15928   The *County FIPS code for subject county* SHALL identify the three-digit county or equivalent entity FIPS 6 code for the subject county (as specified in the Federal Information Processing Standards).

ReqID-15929   The *Harris ID within subject county* SHALL be the HID for a border 1-cell in the subject county, as defined in 3.1.5.1.2.3.

ReqID-15930   The *State FIPS code for adjacent county* SHALL identify the two-digit state or equivalent entity FIPS 5 code for the subject county's state (as specified in the Federal Information Processing Standards).

ReqID-15931   The *County FIPS code for adjacent county* SHALL identify the three-digit county or equivalent entity FIPS 6 code for the subject county (as specified in the Federal Information Processing Standards).

ReqID-15932   The *TLID within adjacent county* SHALL be the TLID for the matching border 1-cell in an adjacent county, as identified per 3.1.3.5 (and in the Southbound **RT-1** for the adjacent county; ref. 3.1.1.3.3).

ReqID-15933   Higher CQV flag SHALL indicate which 1-cell had the higher CQV.

ReqID-15934   A value of 1 (one) SHALL indicate that the 1-cell of the subject county had the higher CQV.

ReqID-15935   A value of 2 SHALL indicate that the 1-cell of the adjacent county had the higher CQV.

3.1.5.3 Harvested Structures and Addresses

The **Harvested Structures/Address File** consists of structure and address related information gathered from TSC&L GIS files. The file will be provided in a common MTAIP format, having been mapped from the original format of the data.

3.1.5.3.1 Purpose

ReqID-11516   The **Harvested Structures/Address File** SHALL provide structure and address information extracted from TSC&L GIS files (as available), per the collection and processing requirements of 3.1.3.6.

ReqID-11517   A single **Harvested Structures/Address File** SHALL be output for a county (or county equivalent).

ReqID-11518   The **Harvested Structures/Address File** SHALL contain a record for every structure in TSC&L GIS files with both a "city style" address and structure coordinates.

ReqID-11519   The **Harvested Structures/Address File** SHALL be devoid of structure coordinates without associated addresses and addresses without associated structure coordinates.

ReqID-15963   Structure coordinates in **Harvested Structures/Address** records SHALL be formatted according to the MTAIP geographic coordinate standards specified in 3.1.5.1.1.1.4, with regard to datum, units of measure, decimal places, and the prime meridian.

ReqID-16048   Longitude and latitude coordinates SHALL be formatted as follows:

- Field length will be variable

- Negative sign will be used for Western hemisphere and Southern hemisphere

- Positive sign will NOT be used for Eastern hemisphere and Northern hemisphere

- Decimal point will be explicit

- Leading zeros will NOT be used

- Trailing zeros will NOT be used

3.1.5.3.2 Format

ReqID-11521   The **Harvested Structures/Address File** SHALL be in a flat file format, with an ISO 8859-1 character set.

ReqID-11522   The file SHALL consist of multiple **Harvested Structures/Address** records, delimited by a <CR> (Carriage Return: ISO 8859-1 decimal value 13).

ReqID-11523   The record length SHALL be variable.

ReqID-11524   Each field within a record SHALL be delimited by a comma.

ReqID-11525   The end of the file SHALL be denoted by a record with the word END.

ReqID-16047   Double quote characters SHALL be used, as required, to enclose text fields when those
               fields contain standard ASCII or ISO 8859-1 delimiting characters (e.g., comma, tab,
               space, quotes, and control characters.)

ReqID-11526   The Record Layout SHALL be as defined in Table 3.1.5.3.

Table 3.1.5.3 Record Layout for Harvested Structures/Address File

Description	Field	EV	Type	Quotes
City-style address 1	ADD1	No	A	As Req.
Address 1 flag	ADD1FLG	Yes	A	As Req.
Address 1 ZIP	ADD1ZIP	Yes	N	
Address 1 +4	ADD1PLUS	Yes	N	
City-style address 2	ADD2	Yes	A	As Req.
Address 2 flag	ADD2FLG	Yes	A	As Req.
Address 2 ZIP	ADD2ZIP	Yes	N	
Address 2 +4	ADD2PLUS	Yes	N	
City-style address 3	ADD3	Yes	A	As Req.
Address 3 flag	ADD3FLG	Yes	A	As Req.
Address 3 ZIP	ADD3ZIP	Yes	N	
Address 3 +4	ADD3PLUS	Yes	N	
Non-city-style address	NCADD	Yes	A	As Req.
Non-city-style address ZIP	NCADDZIP	Yes	N	
Non-city-style address +4	NCADDPLUS	Yes	N	
Local street segment ID	LOCSTID	Yes	A	As Req.
Key to metadata record	MID	Yes	A	As Req.
Date added/modified	DATE	Yes	A	As Req.
Structure type	STRUCT	Yes	A	As Req.
Building status	STATUS	Yes	A	As Req.
Owner name	OWNERNAME	Yes	A	As Req.
Residential/non-residential flag	RESID	Yes	A	As Req.
Multi-unit flag	MULTI	Yes	A	As Req.
Number of units	NUMUNIT	Yes	N	
Multi-structure name	MULTINAME	Yes	A	As Req.
Building name	BLDGNAME	Yes	A	As Req.
Source of structure	SOURCE	Yes	A	As Req.
Datum uncertainty flag	DATUMUNC	Yes	A	As Req.
Structure latitude	STLAT	No	A	As Req.
Structure longitude	STLONG	No	A	As Req.
Coordinate source	COORDSRC	No	A	As Req.

3.1.5.4 Data Delivery

3.1.5.4.1 Directory Structure

ReqID-288   All Northbound data files SHALL comply with the file naming convention defined in 3.1.5.1.1.1.2.

The file naming convention incorporates the state/county FIPS coding scheme SSCCC; where SS indicates the two-digit state FIPS code and CCC indicates the three-digit county FIPS code.

The file extension identifies the record type of the file.

ReqID-16046   All Northbound data files SHALL be in the root directory of the CD.

3.1.5.4.2 Media Format and File Structure

ReqID-300   MTAIP products SHALL be delivered on CD-ROM (CD).

ReqID-9073   A single CD SHALL contain Northbound data for only a single county.

3.1.5.4.3 Media Labeling

ReqID-327   All deliverable CDs, tapes, or other media SHALL have labels affixed in such a way that the labels are clearly visible.

3.1.5.4.3.1 Identifying Information

ReqID-328   Labels SHALL include the following, as a minimum: county name, state name, state/county FIPS code, media version/release number, and date.

ReqID-329   The version/release number format SHALL be as follows: XXX-SSCCC-V.R, where

XXX = First three letters of the company name (HRS)

SS = the two-digit numeric state FIPS code

CCC = the three-digit numeric county FIPS code

V.R = Version/release numbers, as specified in 3.1.5.4.3.2.

3.1.5.4.3.2 Version and Release Numbers

ReqID-335   The first release of the media SHALL have a Version number of 1 and a Release number of 0.

ReqID-336   Any subsequent release of the same media SHALL have version and release numbers as follows:

ReqID-337   If more than 5 errors are found, a new version number SHALL be created for the corrected CDs/tapes (Ex: from version 1.0 to new version 2.0).

ReqID-338   If 5 or fewer errors are found, a new release SHALL be constituted. (Ex: from release 1.0 to 1.1).

ReqID-339   Errors are defined such that if the same type of error is repeated, it SHALL only be counted as one error. For example if 6 duplicate points and 2 wrong CFCC codes are found, the total number of errors is counted as 2.

3.1.5.4.3.3 Security Information

ReqID-341   Each deliverable to the Census Bureau SHALL contain the statement below:

"This item (CD/tape etc.) contains information that is confidential and proprietary to the United States Census Bureau. It may be accessed and used only for official Government business by authorized personnel only. Unauthorized access or use of this product may subject violators to criminal, civil, and/or administrative action."

3.1.5.4.4 Documentation

ReqID-344 Product documentation SHALL include, as a minimum, a summary file referencing the following: production history, source data utilized, significant processing steps, QC checks with results, and acceptance test results.

3.2 Associate Each MAF Address with the Accurate TIGER Database (Reserved)

3.3 Enhance Relationships with Federal, State, Local, and Tribal Partners (Reserved)

3.4 Maintain MAF/TIGER by Detecting Change

3.4.1 Change Detection Process

ReqID-147 MAF/TIGER Maintenance SHALL have the capability to accept and integrate multiple tip-off sources, including, but not limited to, county data, U.S. Postal Service files, commercial leads, and feedback from the field (including contractor field collection and the GEO Regional Offices and ACS Enumerators).

ReqID-148 MAF/TIGER Maintenance SHALL have the capability to process county data sets including cadastral data from the tax assessor's office, planning department data, and validated county GIS change files.

ReqID-149 MAF/TIGER Maintenance SHALL have the capability to process USPS files including ZIP+4 and Delivery Sequence Files.

ReqID-150 MAF/TIGER Maintenance SHALL have the capability to process commercial data including cadastral data, change files, and imagery.

3.4.2 Change Processing

The initial improvement of MAF/TIGER spatial accuracy and related data must be completed for all counties and statistically equivalent entities prior to the end of FY 2008 in preparation for the Census Bureau's 2010 Census. Once the information in TIGER has been aligned properly, it is important that the TIGER database remains accurate relative to a county's rate of change. Detecting changes that take place within selected areas and then updating the files to include all changes will maintain MAF/TIGER completeness and accuracy. The currency of source data to be used may vary depending on the rate of change of the individual County as shown in the Census' County Characterization matrix.

ReqID-141 Change Processing SHALL, beginning in FY 2004, make updates to MAF/TIGER to record the additions and deletions of structures, roads, streets, railroads, hydrographic features, and other features listed herein.

ReqID-9110 Change Processing SHALL use the following constraints to determine the allowable source currency to be used for maintenance:

If the Percent Rate of Change in 10 Years over the county is:
- Less than 1%, the source data used for maintenance can be up to five years old.
- Between 1% and 2%, the source data used for maintenance can be up to two years old.
- Greater than 2%, the source data used for maintenance can be up to one year old.

3.4.2.1 Change Processing Priorities

ReqID-2583   MAF/TIGER Maintenance SHALL establish a ranked list of counties to maintain each year based on change metrics.

ReqID-2585   MAF/TIGER Maintenance SHALL use the following change metrics, as a minimum to determine the counties order of change:

Information derived from USPS DSF mail drops (or BSAs) - it is expected that the Census Bureau will provide summary information from this source.

Information derived from IRS 1040 Administrative Data - it is expected that the Census Bureau will provide summary information from this source.

3.4.2.2 Change Processing

ReqID-13574   MAF/TIGER Maintenance SHALL process county updates according to Census Bureau GFI county priority.

4.0 SYSTEM PERFORMANCE REQUIREMENTS

4.1 Product Performance

ReqID-13468   The absolute horizontal positional accuracy of road features for which a spatial reference exists in the Source Data SHALL be 7.6 meters (CE95) or less i.e. excluding features not present in the Source Data that have been "rubbersheeted").

4.2 Production Performance

This section describes the tolerance and snapping values that are applied during pre-processing and processing of county datasets. Figure 4.2 illustrates possible tolerance and snapping situations.
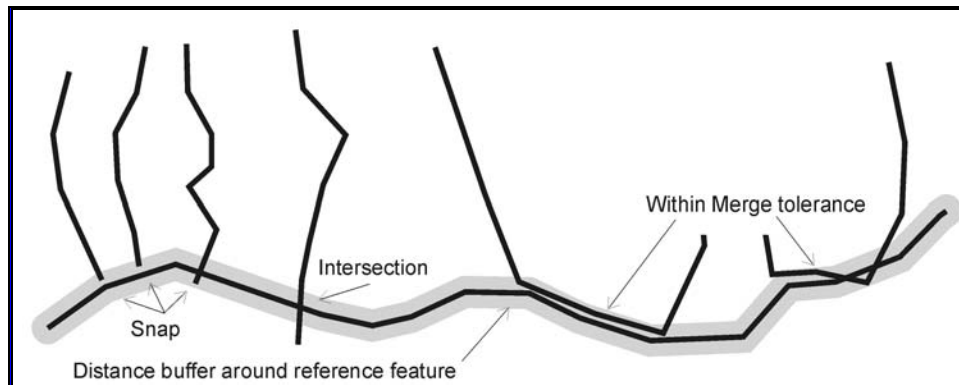

Figure 4.2 Depiction of Possible Tolerance and Snapping Situations

4.2.1 Definitions

4.2.1.1 Tolerance

ReqID-13243   Tolerance SHALL be defined as the minimum perpendicular distance between the points and segments of two line features below which they are made to share the same coordinates.

ReqID-13244   Features closer than the tolerance value SHALL be considered to be either intersecting or a combination feature (thus causing 0-cell creation, 1-cell division, and/or merging of features into a combination feature - e.g. railroad and road features being merged into a single road feature with the Rail in Roadway characteristic assigned)

ReqID-13248   Features no closer than the tolerance value SHALL be considered to be non-intersecting.

4.2.1.2 Snapping Distance

ReqID-13254   Snapping distance SHALL be defined as the minimum perpendicular distance between an endpoint of one feature and the points or segments of another before the features are assumed to intersect at that endpoint.

ReqID-13257   Points farther away than the snapping distance SHALL be maintained as non-coincident points.

ReqID-13259   Points within the snapping distance SHALL be considered to be a single coincident point with the other feature.

ReqID-13260   Points beyond the snapping distance and whose associated segment crosses the other feature SHALL be considered as creating an intersection of the two features.

4.2.1.3 Thinning of Shape Points

ReqID-13266   Thinning SHALL be defined as the removal of feature shape points.

4.2.1.4 Interpolation

ReqID-13268   Interpolation SHALL be defined as the generation of new shape points along the path of the feature's other points, e.g. developing a parametric curve from the feature's points from which additional shape points are generated.

4.2.2 Tolerance and Snapping Values

ReqID-13271   Before computing tolerance and snapping values, source feature shape points SHALL be thinned to a point spacing of no less than 2 meters.

ReqID-13272   Thinning SHALL leave unaffected the beginning and end nodes of features.

ReqID-13273   Before computing tolerance and snapping values, source feature shape points SHALL be thinned to remove 'zingers,' 'unlikely switchbacks,' 'loops,' 'z-paths,' bowties,' and other such anomalies that occur over a short distance so that the remaining shape points will flow smoothly along a feature vector from the beginning node to the end node.

ReqID-13275   Feature endpoints SHALL be snapped, if in the absence of other information, the endpoint of one feature is within 1.5 meters of the points or segments of the other feature.

An example of "other information" that would preclude snapping when the distance is less than 3 meters would be barrier information for an endpoint.

ReqID-13278   When the points or segments between two features are less than the specified 1.5 meters tolerance, the features SHALL be considered to follow the same path and be merged over the within tolerance portions of the features, in accordance with the decision table in Table 4.2.2.

Table 4.2.2 Tolerance Distance Action Decision Table

Linear Features		Matched				Unmatched
		Road	**Rail**	**Hydro**	**Other***	**Unmatched**
Matched	Road	Merge	Set to Road	Move from Road **	Set to Road	Move from Road **
	Rail		Merge	Move from Rail **	Set to Rail	Move from Rail **
	Hydro			Merge	Set to Hydro	Move from Hydro **
	Other*				Merge	Move from Other **
Unmatched						Move one **

* Non-visible, legal boundaries are not merged with anything, except as directed by the Census Bureau or when knowledge of coincidence is available.

** Adjust the coordinates perpendicular to the reference feature until they are at the tolerance distance or slightly more apart.

ReqID-13280   Features intersecting at an acute angle and whose shape points near the intersecting endpoint are within tolerance distance SHALL be preserved in their indicated location.

ReqID-13284   For matched features, the coordinates in the source file SHALL be returned without modification, except as allowed for intersections, snapping, thinning, or tolerance offset moves.

5.0 QUALITY ASSURANCE PROVISIONS

5.1 Requirements Validation

MTAIP Requirements Validation has the goal of ensuring that MTAIP requirements are complete and that they reflect all technical details that may bear on the utility of the improved MAF and TIGER data.

MTAIP requirements have been developed through a series of technical meetings and workshops involving all stakeholders. In these meetings, the Census Bureau and Harris have examined and analyzed the project from a number of perspectives, including the views and needs of the Geography Division, Field Division, Decennial, and other government agencies.

The methodology employed in MTAIP requirements definition has been a multi-stage process involving: 1) conceptual development of statements of objectives; 2) description of processes and products to satisfy the objectives; 3) development of requirements to achieve the processes and products; 4) allocation of specific areas of responsibility to Harris (and to GEO branches); 5) definition of interfaces between Harris and the Census Bureau; and 6) detailed development of specific requirements, progressing to the definition of elemental requirement statements (defined within this document).

5.2 Requirements Verification

ReqID-9048   MTAIP will be developed and implemented so that all requirements contained herein can be verified as specified in Sections 5.3 and 5.4 below. Each verification of a requirement will be carried out in accordance with established procedures. In the case of verification by test (as defined below), the procedure SHALL identify the specific test instrumentation (hardware and/or software) and/or special test equipment used.

The verification methods used will be in accordance with the methods specified below. Use of the term "Not Applicable" will be limited to those section headings and sections in which there are no requirements (information only sections).

Methods of verification will be selected from the following:

- Inspection: Inspection is the verification method used to verify characteristics of an item by inspecting engineering documentation produced during development or by inspection of the product itself to verify conformance with specified requirements. Inspection is nondestructive and consists of visual inspections or simple measurements without the use of precision measurement equipment. For acceptance of an item, verification by inspection includes the assessment of similarity of the characteristics of subsequent items to the corresponding characteristics of the first item generated based on a common design.

- Analysis: Analysis is the verification method used to verify requirements by determining qualitative and quantitative properties and performance of the system by studying and examining engineering drawings, software, and hardware flow diagrams, software and hardware specifications, and other software and hardware documentation (e.g., Commercial Off-the -Shelf (COTS) vendor documentation). It also includes performing modeling, simulation, and/or calculations and analyzing the results. Analysis techniques include interpretation or interpolation/extrapolation of analytical or empirical data collected under defined conditions or reasoning to show theoretical compliance with requirements.

- Demonstration: An exhibition of the operability or supportability of an item under intended service-use conditions. Sufficient data for requirements verification can be obtained by observing functional operation of the system, or a part of the system, without the use of instrumentation or special test equipment beyond that inherently provided in the system being verified. These verifications are usually non-repetitive and are oriented almost exclusively toward acquisition of qualitative data. Demonstrations may be accomplished by computer simulation.

- Test: An action by which the operability, supportability, performance capability or other specified qualities of an item are verified when subjected to controlled conditions that are real or simulated. These verifications may require use of special test equipment and instrumentation to obtain quantitative data for analysis, as well as qualitative data derived from displays and indicators inherent in the item(s) for monitor and control.

5.3 Product Verification

Product Quality will be controlled by four distinct QC checkpoints in the MTAIP process flow. These checkpoints are intended to ensure that inputs and outputs at each stage of the production process meet defined requirements, resulting in a predictable level of final product quality.

5.3.1 QC #1 - Source Product Quality Verification

The purpose of QC #1 is to validate the compliance of MTAIP source data with the source requirements contained herein. Since the quality of the source data is the prime factor in the quality of the final product, QC #1 also establishes the Quality Factors for the remaining quality checkpoints.

The responsibility for QC #1 is shared between the Census Bureau (who has responsibility for government furnished source) and the contractor (who has responsibility for commercial source).

Factors used to evaluate source product quality include the following:

Spatial accuracy

Visibility

Extent of coverage

Feature completeness

Feature currency

Attribute completeness

Attribute correctness

Output products from QC #1 include the following:

Source dataset analysis report

Source dataset quality factors and metadata

5.3.2 QC #2 - Pre-processing Quality Verification

The purpose of QC #2 is to ensure that data pre-processing has been performed in accordance with requirements contained herein.

The responsibility for QC #2 is with the contractor.

Factors used to evaluate pre-processing product quality include the following:

Comparison of consolidated source data against individual sources

Validation that quality factors were correctly applied during consolidation

Validation of attribute mappings from source data dictionary to TIGER data dictionary

Validation of complete coverage the entire county extent

Validation that all data items required for the selected thread exist

Validation that consistent exterior boundaries have been established

Output products from QC #2 include the following:

Integrated source dataset ready to support improvement processing

Edge-matching boundary reference

Consolidated source acceptance criteria report

5.3.3 QC #3 - Contractor Final Quality Acceptance

The purpose of QC #3 is to verify that the production process has been performed in accordance with the procedures, and that the final product matches the source data and satisfies applicable requirements herein.

The responsibility for QC #3 is with the contractor.

Factors used to evaluate final product quality include the following:

Automated tests to validate compliance with topology requirements

Automated tests to validate compliance with geometry requirements

Automated tests to validate that the product is matched to the consolidated source data

Automated tests to validate metadata format and completeness

Automated tests to validate complete use of data source (attributes and coverage)

Automated tests to validate compliance with boundaries

Automated tests to validate data format and completeness

Eyes-on reviews, to include visual checks and statistically distributed inspections in areas of analyst decision points

The output product from QC #3 consists of the Acceptance test report.

5.3.4 QC #4 - Census Bureau Final Quality Acceptance

The purpose of QC #4 is for the Census Bureau to validate the product delivered by the contractor.

The responsibility for QC #4 is with the Census Bureau.

Factors used for product acceptance are maintained within the government.

The output product from QC #4 consists of the acceptance or rejection of the product.

5.4 Product Acceptance Criteria

5.4.1 Positional Accuracy

ReqID-9329   Positional accuracy SHALL be consistent with the source data utilized.

5.4.2 File Format

ReqID-355   All delivered files SHALL conform to the requirements within Section 5 of this specification.

ReqID-356   The metadata file format SHALL correspond to the Metadata File Specification.

5.4.3 Vector Geometry and Topology

ReqID-357   There SHALL be no gaps, overshoots, undershoots, and duplicate arcs in the final deliverable.

ReqID-358   There SHALL be no self-intersecting lines and degenerate lines in the deliverable.

ReqID-360   Each complete chain that forms a TIGER data record SHALL include the start and end nodes and any shape points.

ReqID-361   Every point SHALL be at least two meters apart from all other points in a unique TIGER data record.

ReqID-362   Every point SHALL be at least 1.5 meters apart from all points in all other TIGER data records.

APPENDIX A – ACRONYMS AND GLOSSARY

<CR>	ASCII Carriage Return
0-cell	(Nodes or Points) – Points of intersection or termination; defined herein as Record Type 0 (ref. 3.1.2).
1-cell	(Chains or Lines) – Lines connecting 0-cells; defined herein as Record Type 1 (ref. 3.1.3).
2-cell	(Polygons or Areas) – Entities bounded by connecting sets of 1-cells; defined herein as Record Type P (ref. 3.1.10).
Absolute location	Location on the earth or on a map that has associated with it a specific set of locational coordinates
ACS	American Community Survey
Action Code	A field in the TIGER RT-M Metadata file that indicates what kind of corrective action was conducted on a feature (endpoint adjustment, compound adjustment, etc.)
Activity ID	A field in the TIGER RT-M Metadata file that is used to identify the organization responsible for the adjustment or update activity
Adjacent	When two counties share one or more points along the county edge
Address Range	An attribute associated with a line feature that indicates the start and end address numbers on either side of that feature (left or right)
AIP	Accuracy Improvement Project
AKA	Also Known As
ANB	Area Naming Boundary – A Census defined characteristic used when a hydro feature is part of an aerial unit boundary
Anchor Point	A node representing an intersection of three or more nodes of TIGER linear features, with only roads, railroads and hydrographic features acceptable as an intersecting linear feature. At least two of the intersecting linear features must be roads.
ANSI	American National Standards Institute
ASCII	American Standard Code for Information Interchange
ASQC	American Society for Quality Control
Arc	See Vector
Area Landmark	Cartographically portrayed areas that represent a prominent identifying feature on a landscape
Attributes	Non-graphic descriptors of point, line, and area entities in a GIS
Auggie	Augmented TED
Barrier	An object whose attributes either stop or impede movement through the rest of the coverage
BAS	Boundary and Annexation Survey – An annual program whereby local government units review and update the government name, legal status, and current boundaries, as depicted in the TIGER database
BCF	Boundary Comment Field
Beg	Location of a field's first character in a fixed field record
BIF	Boundary Information Field
BOC	Bureau of Census
Borders	Higher-order groups of line objects that exemplify some functional or political demarcation from one region to another
Boundary	A geographical feature (line, polygon) that indicates or fixes a limit or extent
BSA	Basic Street Address
BTS	Budget Tracking System
BV	Blank Value

Cadastral	Having to do with cadastre, which involves interests in landownership and management
Capture	Alignment: Indicating that a TIGER feature vector has an exact counterpart in the source file, and assigning the source file's coordinates to that TIGER vector. Attributes: Assigning source attributes to TIGER vectors which are aligned to source in the format defined by the MTAIP data dictionary
CAT	Cartographic Alignment Tool
CBAWG	Cost Benefit Analysis Working Group
CCC	Indicates the three digit county FIPS code
CCYYMMDD	Date format where CCYY is the year, MM is the month, and DD is the day
CD	Compact Disc
CE	Circular Error
Census Block	Areas bounded on all sides by visible features such as streets, roads, streams, and railroad tracks, and by invisible boundaries, such as city, town, township, and county limits, property lines, and short, imaginary extensions of streets and roads. Generally small in area; for example, a block bounded by city streets. However, sparsely settled areas may contain many square miles of territory.
Census Tract	Small, relatively permanent statistical subdivisions of a county or statistically equivalent entity delineated by local participants as part of the U.S. Census Bureau's Participant Statistical Areas Program. The U.S. Census Bureau delineated census tracts where no local participant existed or where a local or tribal government declined to participate. The primary purpose of census tracts is to provide a stable set of geographic units for the presentation of decennial census data.
CFCC	Census Feature Class Code
Chain	A chain is a sequence of non-intersecting line segments that explicitly references left and right polygons and start and end nodes
Characteristic	Trait or descriptor associated with a vector. See Attribute
City Style Address	Address that includes at least a street name and house number. May also include zip code and subdivision codes
CM	Configuration Management
CMT	Comment Field
Coincident Lines	Lines that directly on top of one another
Collection Block	A set of collection geographic areas for canvassing and administering the census.
Collinear Lines	Lines are collinear when they are lying on or passing through the same straight line
Complete Chain	Shape points combine with the nodes to form the segments that make a *complete chain*.
Condition Code	A field found in several TIGER RT tables that indicates the relationship between the HID and source material
Conflation	The computational equivalent of stretching a map until its internal components can be rectified
Consolidated Source Data Package	The resulting data package after the Source Data Ingest procedure is completed.
Coregistered	The result of the process of precisely locating the coordinates for two or more GIS coverages so that their spatial locations match each other
COTS	Commercial Off the Shelf

County (or county equivalent)	The primary legal divisions within most states are defined as ''counties.'' - In Louisiana, these divisions are known as parishes. - In Alaska, which has no counties, the statistically equivalent entities are census areas, cities and boroughs (as in Juneau City and Borough), a municipality (Anchorage), and organized boroughs. Census areas are delineated cooperatively for data presentation purposes by the state of Alaska and the U.S. Census Bureau. - In four states (Maryland, Missouri, Nevada, and Virginia), there are one or more incorporated places that are independent of any county organization and thus constitute primary divisions of their states; these incorporated places are known as ''independent cities'' and are treated as equivalent to counties for data presentation purposes. - The District of Columbia has no primary divisions, and the entire area is considered equivalent to a county for data presentation purposes. - In American Samoa, the primary divisions are districts and islands - In the Northern Mariana Islands, municipalities - In the Virgin Islands of the United States, the principal islands of St. Croix, St. John, and St. Thomas. - Guam has no primary divisions, and the entire area is considered equivalent to a county for data presentation purposes.
Cross link	The ability to map two different entities to one another via a third party
Dangling node	A node located at the end of an undershoot
Data dictionary	Detailed description of the data contents of a database, with particular attention being paid to explanations of categories
Data Element	Refers to an atomic level piece of data (i.e., a single field in a database table)
Datum	A reliable starting point from which accurate measurements of the earth's size can be made
Decimal degrees	Refers to the mathematical representation of latitude and longitude (46.9875649, -80.774635)
Degenerate Line	Degenerate line segment – the coordinates of two consecutive points of a line are within a specified tolerance of each other. Degenerate closed line – a closed line defined by a sequence of only three points. This creates a degenerate area.
DOC	Department of Commerce
DoD	Department of Defense
DOORS	Dynamic Object-Oriented Requirements System
DOQQ	Digital Ortho Quarter Quadrangle
DPMS	Distributed Production Management System
DSAWG	Data Source Analysis Working Group
DSF	USPS Delivery Sequence File – A US Postal Service file identifying all mail delivery points recognized by the Postal Service
Driveway	An unnamed road between 20 meters and 150 meters in length that does not connect any two roads together (a dead end road).
E-911	Enhanced 911 System
EAB	MAF/TIGER Executive Advisory Board
Edge Matching	Refers to the process of matching line segments within or outside of a county boundary
End	Location of a field's last character in a fixed field record
End Node	The last geographic coordinate set in a chain.
Entity Point	A point used for identifying the location of point features (or aerial features collapsed to a point), such as towers, buoys, buildings, places, etc.
EPA	Environmental Protection Agency

ESRI	Environmental Systems Research Institute
FCODE	Feature Type Code: This five-digit code encodes the feature type and combinations of characteristics and values that can be assigned to a type. The first three digits encode the feature type and the last two digits encode a set of characteristics and values.
Feature Class A	Road Features
Feature Class B	Railroad Features
Feature Class C	Miscellaneous Transportation Features
Feature Class D	Landmark Features
Feature Class E	Physical Features
Feature Class F	Non-visible Features
Feature Class H	Hydro Features
Feature Class P	Walkway Features
Feature Improvement	The process by which TIGER vectors are aligned to the source file and characteristics assigned
FETYPE	Feature Type
FTYPE	Feature Type (National Hydrography Dataset). The text equivalent of the Feature Type Code (FCODE)
FGDC	Federal Geographic Data Committee
Field	A database term referring to an atomic level data entry point in a table
FIPS	Federal Information Processing Standard
Fmt	Format (L=Left justified; R=Right justified)
Foreign Key	A database term that refers to a column or group of columns that link a table to another table within the database
FY	Fiscal Year
GBF-DIME	Geographic Base File/Dual Independent Map Encoding File)
GCSD	Harris Corporation, Government Communications Systems Division
GCSD	Harris Government Communications Systems Division
GEO	Census Bureau Geography Division
Geocoding	Assigning a household or economic establishment to the appropriate geographic entity, based on address and location
Geographic Area	A polygonal area identifiable by name
Geographic Entity	A point, line or polygon identifiable by name
Geographic Names Information System (GNIS)	The federal government's primary source for identifying official names. The eight-digit identifier for the NHD feature names is stored in data elements named "GNIS_ID"
GeoServ	Geo Information Services, a joint venture
GFI	Government Furnished Information
GFY	Government Fiscal Year
GIS	Geographic Information System
GPS	Global Positioning System
GT	Geometry & Topology – spatial objects with both geometry (coordinate location and shape) and topology (relationship between objects: points, lines, and polygons)
GTAAT	GPS TIGER Accuracy Analysis Tools
GU	Governmental Unit

Harvest	The process of transferring attributes of vectors from the source file to the TIGER file via the Northbound format, but not performing any data translation to the MTAIP Data Dictionary for attribute files. Harvested attributes are returned in their native coding schemes.
HDF	Hard Delete Field
HDR	Header Information
HFY	Harris Fiscal Year
HHNNSS	HH is hours, NN is minutes, SS is seconds
HID	Harris ID
HSA	Harvested Structures/Address
ID	Identifier
IFSAR	Interferometric Synthetic Aperture Radar
INS	Inertial Navigation System
Interpolation	A process of predicting unknown values by using known values occurring on multiple locations around the unknown value
Island Areas of the U.S.	The Island Areas of the United States are American Samoa, Guam, the Commonwealth of the Northern Mariana Islands (Northern Mariana Islands), and the Virgin Islands of the United States. The U.S. Census Bureau treats the Island Areas as entities that are statistically equivalent to states for data presentation purposes.
ISO	International Standards Organization
Lat, Latitude	Angular measurement north and south from the equator
Len	Character length of a field in a fixed field record
LIDAR	Light Detecting and Ranging
Line Features	Line features consist of one or more complete chains sharing common attributes such as feature identifiers, address ranges, and census feature class descriptions. See also "vector"
Long, Longitude	Angular measurement east and west from the prime meridian
MAF	Master Address File
Many-to-many	Refers to a relationship, typically between database tables, in which a row in one table can be joined with multiple rows in the other table and vice versa
Many-to-one	Refers to a relationship, typically between database tables, in which multiple rows in one table can be joined with one and only one row in the other table
Match	An indication that a TIGER feature vector has an exact counterpart in the source file, from which coordinates and characteristics will be assigned. See Capture.
MCD	Minor Civil Division
Means Code	Information providing the source or accuracy of an attribute
Meridian	Line of longitude drawn north and south on the globe and converging at the poles
MID	Means Identification Code
CCYYMMDD	Method of indicating the date. CC = Century, YY = Last two digits of year, MM = Month, DD = Day
MSA	Metropolitan Statistical Area
MTAIP	MAF/TIGER Accuracy Improvement Project
NAD83	North American Datum; established for the United States as of 1983, based on estimates of the center of the earth rather than surface measurements
National Map	Joint venture between the USGS and other government agencies
NCITS	National Committee for Information Technology Standards
NHD	National Hydrographic Database

Node	A zero-dimensional object that is a topological junction of two or more lines (links or chains), or an end point of a line, link or chain. Every chain has two nodes, a *start node* and an *end node* (also known as the *from node* and the *to node)*. The order of the nodes establishes the left and right sides of the line and sets the sequencing order for shape points.
Non-Census ID	Alternative identifiers that are associated with a complete chain
Non-City Style Address	Address that does not include a street name and house number (e.g. rural route, P.O. Box)
OGC	Open GIS Consortium
One-to-many	Refers to a relationship, typically between database tables, in which a single row in one table can be joined with multiple rows in another table
One-to-one	Refers to a relationship, typically between database tables, in which a single row in one table can be joined with one and only one row in another table
Overshoot	An arc that extends beyond the arc with which it was meant to connect
Parallels	Lines of latitude drawn east and west around the globe parallel to the equator
Partition	In the context of the TIGER database, partition refers to a identifiable piece of the database (identifiable by a record number found in Record Type R)
PLSS	Public Land Survey System
PMWG	Project Management Working Group
Point	A geographic entity identified by a single coordinate pair (latitude/longitude)
Point Landmark	Cartographic points that represent a prominent identifying feature of a landscape
Polygon	A multifaceted vector graphic figure that represents an area
PPM	Parametric Planning Model
PPQAWG	Production Planning/Quality Assurance Working Group
Prime Meridian	Arbitrary starting point for lines of longitude located at Greenwich, England
Production Scenarios	Refers to different types of situations that an analyst may encounter while performing MTAIP feature alignment and attribute capture, with production guidelines appropriate to the situation
QA	Quality Assurance
QC	Quality Control
Quality Factor	An indicator of the value, or worth, of a particular vector based on the source from which the position or attributes of that vector were obtained. Quality factors range from 0 to 255; lower numbers indicate poorer quality while higher numbers indicate better quality. A value of 255 indicates that the value of coordinates or attributes with that flag cannot be altered.
Reach	A continuous, unbroken stretch or expanse of surface water
Reach Code	Provides the means to link data to water features; they function like street addresses to roads. The code is a fourteen-digit code consisting of two parts: the first eight digits are the hydrologic unit code for the cataloging unit in which the reach exists and the last six digits are assigned in sequential order. The reach code is found in data elements "RCH_CODE"
Reach Date	The date on which the reach code was assigned. It is found in data elements called "RCH_DATE"
Record	A table-like file

Record Key	A record key consists of a record type, record ID code, and a date field. The record key may be applicable only to the data exchange, or may contain a permanent TIGER ID code, such as the TLID. When one TIGER subfile makes reference to another, that reference is via the **Record key**. The field in the referencing record omits the first character of the **Record key** that is being referenced, so that the field consists of 16 characters.
Record Layout	Provides the contents and layout of data element within a data record
Record Sequence Number	Provides the ability to link multiple names or address ranges
ReqID	Requirements Identifier
RFP	Request for Proposal
RSIS	RS Information Systems
RT-0	Record Type 0 – MTAIP data record defining TIGER 0-cells (points)
RT-1	Record Type 1 – MTAIP data record defining TIGER 1-cells (lines, chains)
RT-A	Record Type A – MTAIP data record defining TIGER addresses and address ranges
RT-G	Record Type G – MTAIP data record defining TIGER geographic units
RT-I	Record Type 0 – MTAIP data record defining TIGER 0-cells (points)
RT-K	Record Type 0 – MTAIP data record defining TIGER 0-cells (points)
RT-L	Record Type L – MTAIP data record defining TIGER Point Landmarks
RT-M	Record Type M – MTAIP data record defining TIGER Metadata
RT-N	Record Type N – MTAIP data record that identifies names associated with features, area landmarks, point landmarks, addresses, or geographic entities
RT-P	Record Type P – MTAIP data record that defines a polygon, constructed from two or more adjoining complete chains that close on the point of origin
RT-R	Record Type R – MTAIP data record that provides the relationship between a feature and its name(s).
RT-S	Record Type S – MTAIP data record that provides an additional series of latitude and longitude coordinate values describing the shape of each complete chain in **RT-1** that is not a straight-line segment
Rubbersheeting	A method to adjust coverage features in a non-uniform manner. The term "rubber sheeting" implies that the data is "stretched to fit." The rubbersheeting process for MTAIP implies that the nodes and shape points of non-matched features will be manually moved in such a way to preserve topology of the dataset. Minimal rubbersheeting is applied so as to preserve the relative shape and distance of non-matched features.
Rural	Refers to a geographical area that has a low population to land area percentage; area is termed "country" or "farmlands"
Shape Points	Non-topological points that describe the position and shape of a chain. Shape points exist only where required, and are associated only with one complete chain.
Snapping Value	Refers to the maximum distance between nodes/chains in which the TIGER CAT tool will automatically align nodes/chains with less analyst intervention
SOO	Statement of Objectives
Source Data Ingest	The process by which source files are prepared for the Feature Improvement process. This includes combining single layers, data transformations, data element mapping, and preparation of the Consolidated Source Data Package.
Source Material	The data used to correct the TIGER data
Start Node	The node that forms the start of a line (chain). A single node can be a start node for one or more lines and an end node for other lines.
SDTS	Spatial Data Transfer Standard
Sub File	One of the data types that makes up a TIGER file. Each sub file will consist of one type of data record (e.g. Record Type 1)

Tabulation Block	They are used in census data products, and will never cross county or census tract boundaries. Nor will they cross the boundaries of any entity for which the U.S. Census Bureau tabulates data including American Indian areas, Alaska Native areas, Hawaiian Home Lands, congressional districts, county subdivisions, military installations, national parks and monuments, places, state legislative districts, urban and rural areas, urbanized areas, school districts, voting districts, or ZIP Code® Tabulation Areas (ZCTAs™).
TBD	To Be Determined
TBMWG	Technical Baseline Management Working Group
TBR	To Be Resolved
TED	TIGER Enhanced Database
TIGER®	Topologically Integrated Geographic Encoding and Referencing database
TIGER Data Ingest	The process by which Census provided TIGER datasets are prepared for alignment.
TLID	TIGER Line Identifier
Tolerance Value	A number that represents the maximum or minimum value that can be reached before an action is taken
Topology	The mathematically explicit rules defining the linkages of geographical elements
TPO	Topology Information Field
TSC&L	Tribal, State, County, and Local (GIS data)
Type	Data Type (A=Alphanumeric; N=Numeric)
TZID	TIGER Zero-Cell Identifier
Undershoot	An arc that does not extend far enough to connect with another arc. Sometimes called dangling arcs or just dangles.
Urban	City-like geographical areas that have a high population to land area percentage
USGS	United States Geological Survey
USPS	US Postal Service
UTM	Universal Transverse Mercator
Vector	A line segment that has a magnitude and a direction. Also called an "arc"
WGS84	Modified version of GRS80, developed for the US military in 1984
YYMMDD	Method of indicating the date. YY = Last two digits of year, MM = Month, DD = Day